

THE TRUE, THE GOOD, AND THE BEAUTIFUL : THE
DARK SIDE OF HUMANIST SCIENCE ; A STUDY IN
THE ANTHROPOLOGY OF SCIENCE AND SOCIAL
HISTORY

Stefano Fait

A Thesis Submitted for the Degree of PhD
at the
University of St Andrews



2004

Full metadata for this item is available in
St Andrews Research Repository
at:

<http://research-repository.st-andrews.ac.uk/>

Please use this identifier to cite or link to this item:

<http://hdl.handle.net/10023/14915>

This item is protected by original copyright

Amend req declaration 1/11/04

ProQuest Number: 10170991

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



ProQuest 10170991

Published by ProQuest LLC (2017). Copyright of the Dissertation is held by the Author.

All rights reserved.

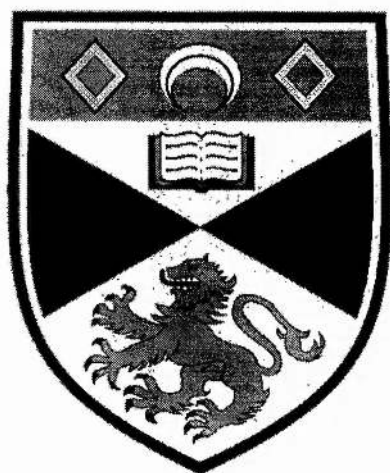
This work is protected against unauthorized copying under Title 17, United States Code
Microform Edition © ProQuest LLC.

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 – 1346

THE TRUE, THE GOOD, AND THE BEAUTIFUL THE DARK SIDE OF HUMANIST SCIENCE

A STUDY IN THE ANTHROPOLOGY OF SCIENCE
AND SOCIAL HISTORY

By
Stefano Fait



Dissertation Submitted to the Department of Social Anthropology

University of St. Andrews

In Fulfilment of the Requirements for the Ph.D. degree

February 18, 2004



Th
E788

I, Stefano Fait, hereby certify that this thesis, which is approximately 100,000 words in length, has been written by me, that it is the record of work carried out by me and that it has not been submitted in any previous application for a higher degree

Date 28 Oct 2006 Signature of candidate _____

I was admitted as a research student in September 2000 and as a candidate for the degree of Doctor of Philosophy in November 2001; the higher study for which this is a record was carried out in the University of St. Andrews between 2001 and 2003

Date 28 Oct 2006 Signature of candidate _____

I hereby certify that the candidate has fulfilled the conditions of the Resolution and Regulations appropriate for the degree of Doctor of Philosophy in the University of St. Andrews and that the candidate is qualified to submit this thesis in application for that degree

Date _____ Signature of supervisor _____

In submitting this thesis to the University of St Andrews I understand that I am giving permission for it to be made available for use in accordance with the regulations of the University Library for the time being in force, subject to any copyright vested in the work not being affected thereby. I also understand that the title and abstract will be published, and that a copy of the work may be made and supplied to any bona fide library or research worker.

Date 28 Oct 2006 Signature of candidat _____

ABSTRACT

How do we systematise our knowledge without undermining mores and beliefs that have thus far guided our conduct? How do we account for free will in a cosmos made of molecules and universal laws? Is a metaphysical rebellion against the absurdity of a universe devoid of ethical significance unavoidable? Is this rebellion inevitably leading to the organization of the world in exclusively human terms? These are the problems that have been tackled among others by Dostoevskij, Kafka, Dickens, and Camus, thinkers who framed questions of paramount importance without finding persuasive answers (Davison 1997; Dodd 1992; Lary 1973). These are the same problems that many bio-scientists have grappled with in the past and I analyze the solutions they have identified.

This work of mine could be seen as a follow-up to the qualitative survey carried out by Kerr, Cunningham-Burley, and Amos in 1998 among British scientists and clinicians with a well-established reputation. That investigation looked into the way the latter distance themselves from the dark shadow of eugenics and revealed that the equation of old eugenics and new genetics is deemed irrational because:

- scientific knowledge has grown by leaps and bounds ever since;
- the socio-political circumstances are radically different as coercion is unthinkable and the final decision rests with the individual who is protected by the principle of informed choice;
- the aims of eugenics simply cannot be technically met;
- the new genetics involves therapeutic aims as opposed to eugenics that concentrated on the alteration of the human gene pool;
- the application of science is not necessarily one of scientists' main concerns;

My contention is that these objections are too facile and unpersuasive. I submit that there is an obvious connection between how the existential and humanistic side of science failed to prove humanitarian, namely benevolent, compassionate and ultimately useful – the good –, the effort by several academicians to ground ethics on scientific evidence – the true –, and our incapacity to confront abnormality – the beautiful.

This connection is eugenics. Eugenics is the scientific response to modern existential angst and social predicaments and is here to stay.

TABLE OF CONTENTS

PREFACE	4
INTRODUCTION	7
1. MODERNITY AND SCIENCE	12
1.1 THE LIFE SCIENCES AND THE PERFECTIBILITY OF MAN: REVOLUTIONARY SCIENCE AND PHRENO-MESMERISM.....	17
1.2 THE PRODROMES OF EUGENICS	24
2. SCIENCE, MEDICINE AND BIO-POLITICS	27
2.1 THE ROOTS OF BIO-POWER	30
2.1.1 INQUISITORIAL BIO-POWER	32
2.2 EUGENICS AND THE MEDICALISATION OF SOCIETY	35
2.3 EUGENICS, PROGRESS, AND THE WELFARE STATE	41
3. SCIENCE, RACE AND CLASS	48
3.1 EUGENICS IN THE UNITED STATES: FROM FEEBLE-MINDEDNESS TO TRANSHUMANISM.....	54
3.2 EUGENICS IN SWEDEN	61
3.3 EUGENICS AND RACIST BIOLOGY IN JAPAN AND SOUTH AFRICA	64
3.4 NAZI EUGENICS AND RACIAL HYGIENE	69
3.5 FASCIST EUGENICS AND EUTHENICS	77
4. SCIENCE, UTOPIANISM, AND THE ENGINEERING OF LIFE	83
4.1 AKIRA UNBOUND: SCIENCE, MYSTICISM AND UTOPIANISM IN POST-INDUSTRIAL SOCIETIES	86
4.2 SCIENCE AND SOCIAL REFORM.....	95
4.3 EUGENICS AS A NEW RELIGION	101
5. SCIENCE, DEVIANCE, AND THE REVULSION FROM COMMON HUMANITY	108
5.1 SCIENCE AND BARE LIFE	110
5.2. BIO-UTILITARIANISM.....	114
5.3 "DO YOU DESPISE OR LOVE HUMANITY, YOU, ITS COMING SAVIOURS?"	127
6. CAN SCIENTISTS PLAY A LIBERATING ROLE?	138
6.1 A SCIENTIFIC MINDSET?	140
6.2 SCIENTISTS AS MORAL AGENTS?	152
CONCLUSIONS	157
BIBLIOGRAPHY	160

PREFACE

When I was an undergraduate student at the University of Bologna (Italy), it became clear to me that I had three main interests as regards didactic matters: death, deviance, and compassion. I was soon to realise that they would play a central role in my private life as well. The choice of volunteering for an association assisting terminal patients and non-autonomous elderly people was the logical outcome of such leanings. It was with them that I learnt the meaning of death (and life), for they devoted a considerable amount of time to musing over death and its role in their life-journey and in modern society. At about the same time, I made friends with Valeria, who opened my eyes about disability.

During those years I learnt that, when it comes to practical matters, abnormality, sickness, mental impairment, physical disability, etc. are synonymous with deviance. In a world that places an enormous emphasis on efficiency, productiveness, utility, competition, and the harmonious functioning of the social gears, as well as on appearances and social skills, the deviant is anybody who is not in step with other people. *Bolognesi* are well known for their kindness so that there was no disdain or pity on the part of the non-deviants towards these "new deviants". However, no matter how hard they tried to cope with the "new deviant" members of their community, the growing acceleration of the contemporary lifestyle would not allow them to meet this challenge. Apart from professional carers, only students, retired and unemployed citizens could afford to devote a decent amount of time to their care¹. The result is social death for a good few.

At the same time, some of my friends were studying to become scientists and doctors and they all agreed that only their passion enabled them to keep up with the demanding requirements of their courses of study. They are now life-scientists, or biomedical researchers, as they prefer to be called. The cleavage between these young, zealous, overburdened students of LIFE who are expected to alleviate the suffering of the older, slow, deviant "philosophers" of DEATH² remains in my mind one of the most fascinating phenomena that I have encountered in my life and has certainly deeply inspired my research.

Another intriguing issue, one closely related to the former, that prompted me to undertake such an inquiry, was the clash between faith in a transcendental being and faith in the explanatory and liberating power of science.

The Italian Parliament has recently passed a law banning the use of donor sperm, eggs or surrogate mothers. This law will also confine the right to artificial fertilisation to "heterosexual couples in stable relationships", forbid doctors to create more than three embryos for each attempt, and to cryogenically store embryos or use them for stem-cell research. One of the most controversial passages, one that will probably be amended, reads that screening for abnormalities on those embryos is forbidden, regardless of the risk of the future child being born with serious congenital defects. The coordinator of the opposition explained his agreement with the spirit of the bill on account of the risk that lack of legislation on these issues would open the door to liberal eugenics and argued: *il liberismo applicato alla scienza e alla genetica rischia di produrre mostri* [liberalism applied to science and genetics is at risk of creating monsters] (Francesco Rutelli, *La Repubblica*, Friday December 12, 2003). However, the majority of the deputies of the opposition rather believe that, if passed, this law would undercut the principle of the secularity of the state and the rights of citizens to make autonomous decisions as regards procreation, as well as restrict freedom of scientific research. This is only the latest episode of a protracted confrontation between religion and science that is set to intensify as scientific discoveries more and more dramatically challenge our beliefs.

The thrust of this thesis is to explore the possibility that the application of a Weberian approach to the study of the interplay of science, ethics, and society, is likely to throw fresh light on the aforementioned confrontation.

¹ <http://www.bandicragialla.it/articoli/articolo.asp?id=1297>

² Due to their fear of and fascination with death, they would time and again involve me in rather complex existential discussions, ranging from their experiences in concentration camps to the meaning of Job's vicissitudes.

Classically, a Weberian approach (Weber 1949, 1968, 1972a, 1972b, 1992, 2000) consists in the combination of interpretation, comparison, and generalization. Weber's basic assumption is therefore that social action is eminently subjective in spite of given societal constraints and that social phenomena can only be understood by means of psychological, empathetic understanding (*Einfühlung* and *Erlebnis*) of the meaning and values that the involved social actors explicitly or implicitly attach to their behaviour. The interpretation of subjective motivations thus constitutes the core of Weberian sociology. My inquiry is Weberian in that I sought to re-experience what a number of life-scientists of the past felt on confronting particular historical circumstances (e.g. the rise of eugenics, scientism, and the Lebensreform movement; colonialism and imperialism; several massive economic crises; the emergence of political experiments of a totalitarian kind; and the seemingly irreversible advance of democracy and liberalism). This partly explains the high occurrence of quotations that I thought were necessary in order to illustrate my attempt to attain the greatest possible understanding (*Verstehen*) by identifying with the actors under study (*Erlebnis*) and their subjective motivations, and reliving their experiences (*Einfühlung*). The frequent use of quotations, lists, glosses, and asides is also a tribute to Paolo Rossi, one of the foremost historians and philosophers of science. Rossi crafts sentences and paragraphs in unpredictable and thought-provoking ways, so that the reader is constantly stimulated, and repeatedly shows that he cares for his readers, that he is not narcissistically writing for himself or for a few supercilious specialists but for a larger audience. It is above all his passion and his professional commitment – that he shares with Weber himself – that I seek to replicate with this study of mine.

For Weber observers, inasmuch as they are direct or indirect participants in the social interaction, cannot possibly maintain an absolutely neutral stand vis-à-vis events and as a result they are guided by subjective criteria of significance and relevance, that is, by their points of view and penchants. Because the social sciences must aim to draw informative generalizations while social realities considerably differ and constantly vary, Weber employs the analytical device called “ideal type”, that helps the observer to simplify reality by selecting some attributes of a given phenomenon that are deemed more salient than others and assimilate some while accentuating the deviation of others from the ideal type.

Accordingly, I have selected several case studies (USA, Germany, Japan, Italy, South Africa, and Sweden) that I believe could best exemplify the kind of socio-cultural pressures faced by dozens of renowned bio-scientists whose opinion carried a lot of weight in the eyes of the public opinion. I thus tried to compare different realities – liberal and social democracies, fascist totalitarianisms, and segregationist states – by keeping my focus on the subjective perception of those realities on the part of leading bio-scientists. I have therefore “ideal typified” the ethos of the life sciences, the sort of pressure exerted upon them by a given establishment, and the establishment itself so as to distinguish more easily between the conduct of scientists who adhered to certain (ideal typified) doctrines not really compatible with the spirit of the scientific method (ditto) from those who did not. The goal of such an examination was to detect possible regularities in the behaviour of scientists subjected to pressure of a political and ideological nature. It goes without saying that I cannot make any pretence to exhaustiveness. This remains my own interpretation, only partially corroborated by my sources, and it is precisely from this combination of historical and anthropological perspectives that this work derives its originality, given that anthropologists of science tend to consider eugenics a highly problematic topic to be left to the care of historians, whereas it seems to me that historians have been up to now quite reluctant to make forays into anthropology. Ultimately, I see no alternative to an approach along the lines of the history of ideas as outlined by Arthur O. Lovejoy (Lovejoy 1936, 1960), namely the investigation of those ideas and compounds of ideas that have circulated widely outside intellectual circles and have affected the taste, aspirations and prejudices of the public

It goes without saying that, in order to prove the validity of my inferences, I had to compare data from the past with contemporary data. Consequently, I interviewed 23 young biomedical researchers hoping to elicit views not dissimilar from those held by their “ideal-typified” precursors. This choice of interviewing young informants was based on the premise

that the common traits would be detectable early in their careers, that is to say that scientific training would be conducive to those habits of thought and standards of conduct that I was interested in.

Naturally, such an approach is open to criticism in so much as it heavily relies on anecdotal and impressionistic evidence. How do I know that those scientists did actually believe what has been reported? Are those views truly generalizable?

But then again this is the trouble with all kinds of qualitative research. I personally look at social sciences as a collective enterprise. A single study should not be expected to clarify with finality such complex arguments. It simply is an hypothesis that must be verified by other investigators using different means and different perspectives.

Besides the perusal of the relevant literature, my fieldwork has consisted of a series of individual interviews (23), conducted between winter 2002 and fall 2003 in Northern Italy, Scotland, and Canada. The open-ended semi-structured character of my questions granted some leeway to both the interviewer and the interviewees. Contemporaneous notes have been taken and written up in a final form a few hours after the interview. In Scotland questions have been integrated with a brief period of participant observation with young researchers outside the laboratory.

INTRODUCTION

I had been taught science as a steady progression of insights by intellectual giants. It had never occurred to me that these heroic figures were fallible human beings, as competitive, jealous, ambitious and biased as any other group of experts.

David Suzuki, geneticist (Hindmarsh & Lawrence 2001: 4)

Everybody has his blind spot or his Achilles's heel, and scientists are no exception. Many of them believe they are impartial in their thinking and uninfluenced by their surroundings. Some are very egoistic, and put forward ideas that they feel the whole human race has got to bow down and accept. Others might be excellent in one area of science – astronomy, for instance – yet believe that have insights into all fields, without an awareness of the pitfalls. Scientists are human – they're as biased as any other group. But they do have one great advantage in that science is a self-correcting process

Cyril Ponnamperna, chemist (Weintraub 1984: 14)

What I'm getting at is that if you examine the history of science you can see that it has been manipulated in the name of politics and religion. The Nazis did this. There's been lots of sham science that in retrospect was misguided. And this has brought untold harm to society. Granted you're a person who closely gathers evidence, but most people, told by authority figures that something is "scientific", swallow it whole and go along with whatever they say. And to me that's very frightening

Murakami Haruki speaking to Hiroyuki Kano, an AUM-Shintokyo member who had previously claimed he wanted to mathematically prove Buddhism (Murakami 2001: 222)

My point of departure is that ever since the Enlightenment (Gay in Barber & Brumfitt 1967; Hilts in Mendelsohn 1984), society has been partially shaped by those worldviews that biomedical professionals concurred to create through their activities and the divulgence of their theories and data (Sfez in Lavoie 2001; Zack 2002). A parallel assumption is that when this is the case bio-scientists are more liable than their colleagues to lose sight of the big picture and fail to figure out properly the ethical and social implications of the theories they present to their peers and to the public at large.

Professionals should therefore be seen as ideational agents, i.e. creators of worldviews that over time can even be turned into coercive mindsets (Barber 1978) when an ill-advised trust in a "scientific attitude" as the ultimate solution to all society's flaws (Gregory-Miller 1998) prevails.

All in all science affects our morality and cognition³:

1. By changing our worldview and the way we deal with what surrounds us
2. By providing us with more things to do and a greater leeway, which also entails new opportunities of wrongdoing
3. By demolishing our anthropocentric outlook
4. By suggesting that the scientific method is suitable for making value-judgements

Hence, one of the hypotheses I sought to demonstrate with this thesis was that, particularly in the life sciences, every scientific statement can also be a political one (Seidler & Rett 1982) and that the protagonists of this genomic era should be more cautious when they air their views. This should be self-evident in the light of the historical evidence that humanist scientists and doctors have time and again lost sight of the cardinal principles of the Enlightenment that is, personal autonomy, universal justice, and basic human rights (Pichot 1995, 2000).

We may postulate that this was probably inevitable insofar as modern humanism arose from the overcoming of the conventional view of life in the service of transcendental purposes or mundane virtues, which was replaced by a conceptualisation of life as a quest for happiness and a goal in itself that could be attained through rational means (Taylor 1984). The nub of the problem is that the ideal of emancipatory critical rationalism has spawned those dogmatic and delusional beliefs that typify scientism (Taguieff 1987). Furthermore, the yearning for absolute objectivity on the part of

³ According to J.B.S. Haldane in "Science and Ethics" (1932) as quoted by Vollrath 1990

scientists, and their treating their vocation as self-evident, something that cannot be renounced, induce many scientists to embrace an ascetic, stoic self-discipline, and to make a fetish of their vocation and practice (Burrow 2000). This has caused several of them and the public to believe in *their worthiness to assume priestly functions in an ever more secularised society* (Daston & Galison 1992).

Objectivity, specialization, and professionalization give rise to a myopic expertise (Nietzsche 1974), which turns knowledge into information and wisdom into technical mastery (Weingart et al. 1988), as well as forming scientists who are not expected to wholly understand either the overall scope of their tasks or their social implications (Brown 1998). This parcelization of duties is certainly alienating (Longhi 1997), and it has been suggested that the end result is a golem, a system that appears to be unguided and possibly uncontrollable, being the resultant of disparate, temporary decisions (Gyorgy Markus in Gavroglu et al., 1995: 142). Genetic counselling is a case in point:

We are in a fast-moving train, and we manage to learn how to eat in the train, even sleep in the train. But I don't think we think very much about where the train is going. Or, at least, we are very simplistic...Of course, geneticists are the ones creating the technology. But it is being created without too much thought. Of course, if you really want to get to the social issue, you'd better get to whoever is driving the train...When I began, this work belonged in academic medicine; now it is rapidly commercializing. Pretty soon, it will just be profit-making labs offering kits. They'll have a roving genetic counselor to pay lip service to malpractice insurance. This is not what geneticists wanted when we insisted on genetic counseling

Avram Terguwnick, medical geneticist (Rapp 2000: 23)

I believe Terguwnick has made an important point here. That is not what scientists originally wanted. A humanist enterprise has gradually soured. Why did that happen?

Should we posit that it was because *Wissenschaft ist human im Sinne von menschlich und nicht...per se "humanistisch"* [science is human in the sense that is being done by human beings and not...because it is intrinsically humanistic]⁴?

With this thesis I investigate those factors that have thus far thwarted human efforts to establish a veritable scientific humanism. These factors will include:

- Vulgar utilitarianism and arid consequentialism (Weindling in Lee 1990; Marks 1995; Glass 1997). A good few scientists do not see the potentially dangerous implications of their public statements and blindly rely on the equation of social utility and beneficence (Sarah Cunningham-Burley & Anne Kerr in Conrad & Gabe 1999; Kass 2002);
- Reductionist materialism, biological determinism, genetic essentialism, scientism (Gould 1981; Sprinkle 1994; Vandermeer 1996). The idea of man as an abstraction which is typical of biological determinism and genetic essentialism is apt to be exploited in the pursuit of totalitarian goals (Talmon 1970);
- Obsequiousness to the imperatives of bio-politics (Foucault 1980, 1994a, Agamben 1995, 1998), grounded on the concomitant blind devotion to Western meta-narratives such as "science and technology lead continually to progress" (technocracy); "perfect rationality is achievable and is the ground of all legitimate decision-making" (unrestrained positivism); "science itself is neutral, good and evil are matters of its application" (scientism); "democratic or human values can correct the errors and excesses of new technologies" (retroactive decision-making); "ethics are universal and can (and must) be agreed upon by all humans" (monocultural universalism) (Michael Fortun 2003⁵; see also Weingart et al. 1988; Tucker 1994; Darnowsky in Tokar 2001)
- Misguided idealism (Freedman 1983; Becker 1990; McLaren 1986, 1990, 1992; Burrow 2000): *I project myself into the future and look back at myself and my fellow human beings in the present, and I say to myself. What is it that needs to be done now in order to bring about change much sooner* (medical scientist Jonas Salk in Weintraub 1984: 104). When

⁴ Meinel & Voswinckel (1994: 18)

⁵ Rensselaer Polytechnic Institute, course syllabus

techno-science fails to meet actual human needs this does not only happen due to greed and lust for power but also because scientists lose sight of them when they are blinded by visions of salvation via technical fix (Midgley 1992)

- Elitist callousness and superciliousness (Field 1911; Sax 2000; Childs 2001; Stone 2002). Several among the leading scientists exhibit and at times alarming self-righteous hubris and insensitivity as though people do not know what is good for them whereas scientists know better (Noble 1999). A case in point is Francis Crick's assertion that he would rather live in a world in which *the point of view of people like me was more or less held by the great majority of people* (Weintraub 1984: 28). But is not this the core belief of the inquisitorial mentality? That what does not harmonize with the Truth ought to be damped down, like heresy? (Baud in Nathan-Olff 1993). This same condescendence lies at the foundation of social Darwinism and eugenics, for the fittest could realise the ideal society only by stamping out the weak and inefficient, i.e. the burden (Breeman et al. 1990). Like Victor Frankenstein (Vasbinder 1984), most eugenicists, for all their pretence of humanism, failed to prove to be able to truly love humanity.

The first three entries have been extensively analysed over the past decades and I treat them in chapters 1, 2, and 5. To my surprise, the last two have been relatively unheeded, perhaps due to their highly controversial nature. It certainly requires boldness and a strong body of evidence to insinuate that snobbery and ill-advised idealism played and still play a major role in scientific research. And yet we know that science is a socially embedded endeavour as its goals, theories, focus, and methods are affected by the broader social context (Barnes 1972, 1974; Mendelsohn et al. 1977; Gould 1981; Latour & Woolgar 1986; Latour 1987; Proctor 1991; Agazzi 1992).

It is indeed of the essence that readers of this thesis understand that the overall layout and thrust of this work rest on the assumption that the above-mentioned penchants are not uncommon among scientists. Eugenics in particular – but there is no reason to believe that the same does not apply to current repro-genetics and genetic engineering –, in that it had a direct impact on the everyday life of masses of citizens, was tremendously apt to bring those proclivities to bear upon basic bio-genetic research.

On the other hand, I find it rather puzzling that a number of professionals in the social sciences and biomedical sciences shut their eyes to the reality of facts, i.e. that the identification of the genotype of future people will inevitably lead to a eugenic revival (Kitcher 2003). This inevitable outcome was already clear to R. D. Hotchkiss as early as 1965 (Abelson 1965) when he said:

Many of us feel instinctive revulsion at the hazards of meddling with the finely balanced and far-reaching systems that make an individual what he is. Yet I believe it will surely be done or attempted. The pathway will...be built from a combination of altruism, private profit and ignorance

Even if we choose to understate the importance of the guilt-feeling of parents who feel responsible for their children's shortcomings, still this world shamelessly tolerates such a measure of social and economic inequity from the moment of a child's conception that it seems difficult to believe that public outcry will arrest the creation of further biological disadvantages through reprogenetic interventions (Caplan 1997).

The basic problem is not how to prevent a new eugenics from taking place, for that is inevitable, but how to get the message across to scientists as well as to laypeople that a society still plagued by powerful racial and class biases as well as by huge economic and educational disparities is likely to make bad use of techno-scientific innovations of such a scope (Roberts 1964; Kitcher 2003). It follows that those who fault the HGP for the negative repercussions of its discoveries are seriously mistaken, in that we are the culprits, for we have partially failed to learn the lessons of the past. It is precisely those lessons that I revise in my study.

Father Zossima in "The Brothers Karamazov" observes that in science the only matter of consequence is the sensuous world, not spirituality, which is instead scorned *with a sort of triumph*, for such a rejection opens the door to true freedom (P. Simpson in Burnett 1981). Accordingly, in 1876 Dostoevsky declared that (Davison 1997: 117):

Love of humanity is inconceivable, incomprehensible and even impossible without a belief in the immortality of the soul. Those who, having ripped to pieces our belief in the immortality of the soul, seek to replace this belief with that other ideal which is love of humanity, these people, I say, trespass against themselves, for instead of love of humanity it is nothing but the seed of hatred of humanity that they sow in the heart of those who have ceased to believe... I maintain and dare to declare that love of humanity in general is, as an idea, one of the most inaccessible to the human mind. Precisely an idea. Only sentiment can provide it with justification. But sentiment is only possible if one is convinced of the existence of the soul

I cannot help but feel that such a view acquires a greater significance in the light of what we have learnt about the nature and aims of the eugenics movement and in view of the stated purposes of contemporary genetic engineering. Should we presume that those scientists involved in such an enterprise – the manipulation of the genetic code of animals and plants – are conscientious enough to steer clear of the hubris intrinsic to a worldwide project that at times depicts man as a potential Nietzschean God-man, the succulent fruit of our creative rebellion against our transcendental father? Should we really expect them to be moral agents as well as exceptional pioneers of human knowledge? At the same time, how do we explain the emergence of that new brand of utopianism called Transhumanism that feeds upon both New Age cultism and the promises of genetic engineering? What part do bio-scientists play in the promotion of such ideologies through their unguarded announcements and their outlining futuristic scenarios of predictive medicine, greater physical and intellectual faculties, and enhanced staples?

On one side we see an absolute faith in the capacity of humankind to effects those social reforms that will become necessary once the whole range of new biotechnologies will be made available. They include hundreds of scientists committed to the Human Genome Project, thousands of people who hope that bioscience and medicine will cure their illnesses or somehow better their existence, naïve cultists such as the extropians and the transhumanists, and the biotech and pharmaceutical corporations together with their lobbyists. I suspect that if they were asked to explain the denouement of the Poem of the Grand Inquisitor, many of them would subscribe to the interpretation made by D.H. Lawrence, *Nietzsche's major English disciple* (Carey 1992: 75):

And we cannot doubt that the Grand Inquisitor speaks Dostoevsky's own final opinion about Jesus. This opinion is, baldly, this: Jesus, you are inadequate. Men must correct you. And Jesus gives the kiss of acquiescence to the Inquisitor

Belknap (1990: 127)

And they would be seriously mistaken, because on several occasions Dostoevsky himself maintained that his intention was to run against the Grand Inquisitor's rationalization of despotism (Belknap 1990). Jesus's kiss is rather one of mercy, one that proves that since even the Grand Inquisitor could be forgiven, then lesser sinners would surely be saved as well. In this way Dostoevsky exposed the futility of the Grand Inquisitor's plans and, indirectly, contested the Protestant and Calvinist belief that a reward should be sought in this life. He also questioned the assortment of the till then unstructured themes, desires, and habits of the mind that would give rise to the eugenic dogma that it is only through the enhancement of the creation that humankind can attain its "redemption" and spiritual refinement. Accordingly, he lumped together scientism, utilitarianism, positivism, materialism and voluntarism under the rubric "the enemy" (Belknap 1990):

The finest science of his time was reductionist, seeking simple material explanations for complicated biological, geological, mental, social, and even spiritual phenomena. Dostoevsky rejected this reductionism and the positivistic faith that went with it

Belknap (1990: 34)

The other side is that of the apocalyptic pessimists who cannot believe that compassion and solidarity permeate society to a measure sufficient to guarantee that such techniques won't be misapplied and won't aggravate inequality. The champions of this view would agree with Camus that rejecting the God of Love or the principles of solidarity and

egalitarianism more often than not involves embracing a paternalistic and nihilistic humanism. Many theologians, philosophers, and social scientists, as well as a few scientists, position themselves in this quarter.

In the middle stand all those who are too puzzled to take sides.

I take the liberty to confess that I started my fieldwork on the side of the pessimists and I then went over to the other side – as I was influenced by the enthusiasm of my informants –. All through my research I have been, in the words of Camus, “prey to my truths”. As of now, I find myself nonplussed. I suspect my fieldwork has become an existential journey also due to the proximity of the life-sciences to the realm of the most deep-felt and challenging questions about the meaning of life, the role of our species in the universe, and the quest for freedom, happiness and serenity. The pivotal role of science in many persons’ moral development is best described by Francis Crick’s assessment of his intellectual and spiritual journey (Midgley 1998: 78):

This loss of faith in Christian religion and my growing attachment to science have played a dominant part in my scientific career...I realised early on that it is detailed scientific knowledge which makes certain religious beliefs untenable...What would be more important than to find our true place in the universe by removing one by one these unfortunate vestiges of earlier beliefs?...it seemed to me of the first importance to identify these unexplained areas of knowledge and to work toward their scientific understanding

This sort of transition from the well-trodden path of faith to the uncharted territory of the discoverable unknown generally exacts the payment of a high price in terms of cognitive stability. Within science the loss of firm landmarks and templates has proved to be apt to provoke a fluctuation between anthropolatry – anthropocentrism run wild – and nihilism – “humans pollute the Earth” (Midgley 1996). This is so because an understandable apprehension about one’s own insignificance in comparison to the sub-atomic and cosmic vastness of the universe is likely to lead to scientific mysticism and utopianism (Midgley 1996: 142):

Such fantasies...have to be compensations, myths designed to supply significance, dreams that console scientists who are starved of spiritual fodder by a confused Puritanism, a mistaken isolation of the intellect from the rest of life

But this should not be seen as inevitable if scientists were allowed to become “whole humans”, accepting that the truths of science are not the only available truths and that science alone cannot be a spiritual guidance. If they were taught ethics and the history of science, they could enjoy my same feelings of awe and bewilderment before the enormous implications of the choices we are facing instead of the self-imposed assurance of those who simply have no alternatives but to quicken their pace lest they should come to terms with obnoxious dilemmas. Through a basic training in humanities, their own rebellion against nature’s determinism could benefit from the spirit of Ivan Karamazov’s rebellion (Davison 1997: 119):

Ivan’s revolt is deeper than that of the Romantic movement in general, of which it is nonetheless a part, because it emphasizes...solidarity and love, whereas the Romantic revolt was individualistic and blaspheming against a cruel God

1. MODERNITY AND SCIENCE

The outcome of the scientific approach is to depreciate man. Astronomy proclaims his microcosmic size. Biology claims that he had animals, if not for parents, at least for first cousins, in the long evolutionary series. Chemistry affirms that he is a compound of hydrogen, oxygen, carbon, and other elements, of the same essential stuff as sticks and stones.[...]. If we add to the theoretical degradation of science the fact that it has supplied the weapons whereby the human race can be liquidated, the indignity is complete

Francis Ensley (as quoted by R. Allen Utke 1978: 190)

Yesterday's science is today's common sense and tomorrow's nonsense

Frank B. Livingstone (anthropologist, University of Michigan)

Et toutes ces données, ces mesures, ces moyennes ne s'enlisaient pas dans une objectivité amorphe de traîne-savantes. Elles étaient dynamisées par un vigoureux manichéisme qui faisait d'elles autant d'expressions du bien ou du mal

The "scientific" accuracy of the racial classification drawn by SS Sturmbahnführer Professor Doktor Otto Blättchen in Michel Tournier's novel "Le roi des Aulnes"

In the 18th century an idea became popular among the intellectuals, that hidden though truth may be, it still is discoverable and definitively grasped by those who correctly use their rational faculties. This is what Karl Popper called "optimistic epistemology" (McIntosh 1992) and modern science arose from this inquisitive spirit.

Nietzsche imputed the ever-growing importance of science to an intrinsic need of Christian believers to seek truth and certainty and, being unable to find them in their faith, to turn to science as the ultimate source of redemption. As science proclaimed the death of God, it followed that Christianity was the cause of its own extinction. In other words, for Nietzsche nihilism was inherent to Western values and the completion of the project of modernity would entail the end of our civilization. This followed from the positive immorality of nature (Appleyard 1998) and from the fact that science is not self-reflective and cannot set limits to its inquiries. Its hubris is bound to dig humankind's grave (Teichmann 2001).

That the Christian will to truth has exploded Christianity itself is the first of four paradoxes that connote progress as it has originally uncoiled in Europe, the other three being that:

1. Free individuals are more prone to be fragmented by the massification process (Adorno, Marcuse, Horkheimer);
2. Capitalism promotes self-development but restricts the gamut of options: market-economy only calls for specific abilities and talents (Marx);
3. The growing population with its demands cannot be administered without massive bureaucratisation, which in turn restrain citizens' liberty (Weber);

"The fate of our times", for Weber, was that the more we learn about reality the harder it becomes for us to make sense of our cognisance in terms of values. The disenchantment (*Entzauberung*) of the world brought about by science means that our scientific proficiency is not always sustained by an equally sophisticated collective morality informing our conduct (Mongardini 1991). Disenchantment in turn occasions disillusion, a modern malady whose gravity is proportionate to the relinquishment of the idea that eternal salvation and otherworldly happiness is the final human goal (Hopper 1991). These are the iron cages of modernity (*stahlharte Gehäuse*) that could transform us in either *Fachmenschen ohne Geist*, specialists with no spirit, or *Genußmenschen ohne Herz*, sensualists without heart (Weber 1972).

We witness the constant struggle of irreconcilable values and between instrumental rationality (*Verstand*) and reason (*Vernunft*) compelling us to create our own value-orientation with no objective guidance, according to self-chosen principles (Brubaker 1984), namely the Kantian tenet that individuals fashion their own ethical stances (Owen 1994). But when we act on the basis of mere material and mechanic motivations (*Zweckrationalität*, i.e. instrumental rationality) rather

than ethical and spiritual considerations (*Wertrationalität*, i.e. axiological rationality), we ignore the tension between means and ends and confuse facts and values, scientific notions and moral imperatives (Horowitz & Maley 1994). Scientism, one of the main themes of my thesis, persists because natural and scientific models ("is") have all too often given rise to prescriptive aims ("ought") (Rigotti 1986).

However, according to this perspective, dehumanization is not the inevitable outcome of such a scenario. The gist of Weber's argument is that modernity is not a uniform phenomenon but one typified by a number of antagonistic tensions – self-indulgent hedonism and ascetic frugality, apocalyptic fears and utopian expectations, materialism and spiritualism, emancipation and regimentation – that prescribe and proscribe certain behaviours within given life-contexts and spheres of values (Scaff in Turner 2000). Modernity comprises a "romantic syndrome" countering the fragmentation and objectification of the life-spheres and our alienation before the complexity of contemporaneity (Weiß in Mongardini 1991), which has been often mistakenly labelled "Counter-Enlightenment" (Berlin 1990) when it really functioned as a corrective of the Enlightenment's excesses (Weiß in Mongardini 1991), as well as the positivistic outlook addressed by Weber and other contemporaries (i.e. Durkheim, Tönnies, Simmel, etc.).⁶

The concepts of humanity, individuality, subjectivity, etc. developed simultaneously with modern science (Bayertz in Sandkühler & Holz 1987), and the very idea of progress is indissolubly linked to the Romantic dismissal of a complete and permanent Chain of Being – from amoebas to God – replaced by a pluralistic, historical conception of the role of humans within the Creation (Lovejoy 1936; Wilson 1980). At the same time, within the realm of science we also discern conservative tendencies (Kaye 1986: 49). The evolutionary model of ethics that has been proposed by several scientists and philosophers, whether they are vitalist, inspired by natural religion, or by a teleological mechanistic understanding of life, looks pretty much like the ancient longing for a past Golden Age in which civilization, nature and biology co-existed harmoniously, and order still obtained. This phenomenon has been termed "conservative modernization" by Jeffrey Allan Johnson (1990), who points out that in Wilhelmine Germany science as an institution was invariably inclined to effect exclusively moderate changes lest to subvert the state of things, in spite of the tendency of a number of scientists to act and think radically.

This bizarre compound of modernist and conservative impulses arose in the course of the Seventeenth and Eighteenth centuries, when scientists sought to combine the social, the spiritual, the physiological, and the natural (McKnight 1992) and eugenics in its modern version, which dates back to the 1880s, cannot be understood unless we refer to the contradictory nature of this confrontation between individual inclinations, various forms of positivistic scientism, and the Romantic iconoclastic assault on the monistic belief that there had to be a single overarching truth, a single way to arrive at it, and a single way to administer society, i.e. bureaucratic rationalisation. Its schizophrenic character can only be accounted for by analysing the combined effects of the inherently pessimistic Romantic epistemology, the Enlightenment's positivistic optimism (McIntosh 1992), and the concoction of Arcadian and utopian sentiments that converged into a dangerous contempt for the present (Sorensen in Bartels, Leroy, Caplan 1993), the hallmark of those people who feel they are born too early or too late. On this count, Mary Midgley (1985: 46) has in my view correctly emphasised the resemblance of some scientists' worldview with the Nietzschean contention⁷ that *higher than love of one's neighbour is love for the remote and for the future. And I hold love for things and phantoms higher than love for men*. Consequently, the ideological framework of eugenics presupposed a tendency to cling to apocalyptic predictions and millenarian pessimism, as well as to the delusional faith in a techno-scientific quick-fix, the scientific faith in benevolent progress (Weingart et al. 1988; Tucker 1994). The nature of this interplay is epitomised by two statements made by Julian Huxley (Huxley 1947):

⁶ In passing, many German Romantics were well versed in mineralogy, physics, botany, physiology, and chemistry (Hayes 1994)

⁷ in "Thus spake Zarathustra"

- *humanity will gradually destroy itself from within, will decay in its very core and essence, if this slow but relentless process is not checked* (p. 51)
- *striking a rapid eugenic results can be achieved only by a virtual elimination of the few lowest and truly degenerate types and a high multiplication-rate of the few highest and truly gifted types* (p. 34)

All in all, it was this tension between apocalyptic fears⁸, utopian ideals and reforming aspirations that gave birth to that enormously intricate interplay of activism, obsequiousness, boundless optimism, despondency and paternalist/pastoralist authoritarianism that characterized eugenics since life-sciences became professionalised. This reflected the heterogeneousness of the Enlightenment, which varied from country to country, from the British rationalistic optimism, to the contentious and revolutionary approach of the French, and to the persistence of vigorous transcendental yearnings in Germany (Ciardone 1978).

In *Naufragi senza spettatore* (Rossi 1995), Italian philosopher and historian of science Paolo Rossi has beautifully summarised these issues:

- Modernity cannot be understood without taking into consideration the tension existing between great expectations and the fear of looming catastrophes;
- the linear representation of progress is always accompanied by an undulatory or cyclical kind. The notion of progress has always been interlocked with utopianism as well as millenarianism, primitivism, and retrogression or decay.
- the idea of democracy has normally been linked to the notion of endless cumulative knowledge, i.e. the cornerstone of science;
- the idea of progress was not a peripheral attribute of science but part and parcel of its modern conception
- the original concept of progress was not as absolutistic and normative as in its late-Enlightenment and positivistic forms and science and technology have never been considered as the only means for human liberation;
- the ambiguous character of modernity had always been present in the reflections of the so-called modern thinkers.

In short, there has never been a pure ideal of Enlightenment thinking – centred on three cardinal principles of logical rigor, experimentation and the verification of hypotheses – that has been subsequently degraded by the dispute between positivism and romanticism. On the contrary, the initial ambivalent and tentative outlook seems to have been closer to ours than to the mechanistic-positivistic one that dominated science – and pseudo-science – by the nineteenth century and that so deeply influenced eugenics (Rossi 1995; Tagliapietra 1997). In the 18th century science was viewed as a communal enterprise, an edifice that was being built thanks to the collaboration of countless more or less adept inquirers and that was not meant to be brought to completion but simply to effectively serve the interests of the entire human species (Rossi 1962). The ideology of progress was born when the evidence that scientific knowledge was improvable and transmissible and that it was therefore superior to spiritual wisdom became an axiomatically accepted truth (Rossi 1962).

This rapid and necessarily sketchy excursus has served the purpose of better circumscribing the arguments that I analyse in my dissertation. The bottom line seems to be that the secular narrative of modern Europe has been incessantly possessed by two jarring currents of thought, one drifting towards relativism, and nihilism⁹, and the other permeated by

⁸ Incidentally for Jay Taylor (1993) the idea of destroying a sick society in order to replace it with a utopian brave new world was part and parcel of the totalitarian ideologies of the twentieth century

⁹ *relativism does entail nihilism: if standards are inherently and inescapably expressions of something called culture, and can be nothing else, then no culture can be subjected to a standard, because (ex hypothesis) there cannot be a trans-cultural standard which would stand in judgment over it. No argument could be simpler or more conclusive* (Gellner 1992: 49)

pragmatism, positivism and analytical inclinations. It is impossible to understand the one without referring to the other as much as it is incorrect to analyse any social phenomenon, science included, by classifying it into either category. Science proceeds from both leanings and scientists as human beings concur to make this interplay more complex and suggestive. The dynamics of this confrontation is precisely what has shaped our contemporary society and culture. Intriguing is the evidence showing that both strands share some sort of deterministic inclination. Both biological, evolutionistic determinism and a finalistic blind faith in progress have been embraced by reductionists and holists alike.

Consequently, it is a serious mistake to associate the Enlightenment with dehumanization and *Entzauberung* (literally, "demagification") as much as it is erroneous to view Romanticism as a backward-looking reaction to the Enlightenment (Rossi 1995; Ferrone in Ferrone & Roche 1997) that would result in the irrational voluntarism of the existentialists, in the nihilism of Nietzsche and in the Dasein-reflections of Heidegger (Scalfari 2001). It is true that occasionally the *philosophes* appear to lapse into the bad habit of mistaking partial, publicly disputable reasons for pure Reason, but their legacy also comprises a sceptical approach to all absolute abstractions, reactionary utopianism included, as well as the famous trinity "liberty, equality, and fraternity". Their scepticism prevented them from logically following through to nihilism their relativistic premises which they shared with most of the proponents of the Counter-Enlightenment (Scalfari 2001).

Likewise, it is hardly controversial that Romantic thinkers were infatuated with the power of the mythical, the sacred, and the symbolic, but this does not imply that theirs was wholesale irrationalism (Scalfari 2001). Darrin McMahon (McMahon 2001) has lucidly pointed out those traits that make the Counter-Enlightenment an intellectual enterprise that was at least as rational and modern as the Enlightenment. For instance it was their inventiveness that reformed religion (see also Outram 1997). And even if some of their contributions to the establishing of a modern outlook were inadvertent, like for example their insistence on the moral decadence of French society that they imputed to the *philosophes* but that was an actual phenomenon in the late 18th century, which concurred to expose the evident shortcoming of a system in need of a thorough revision, their concern about social fragmentation, dehumanization, mechanism was all but modern, as it was their critique of those claims that techno-scientific progress would go hand in hand with moral improvement (McMahon 2001). My impression is that both sides demonstrated a remarkable far-sightedness as concerns the detrimental effects of progress and they simply laid a greater emphasis on certain themes that were more congenial to their respective agendas.

The thesis I defend is that this utopian belief in progress, its antithetical but historically complementary belief that humankind was on the road to dissolution, its absolute reliance on materialism, mechanism, racialism, and moral hierarchisation (Widmann 2001), together with the sentiment that nature and human affairs could not possibly be left to chance, is what diverted the life-sciences from the liberal and democratic character of modernity. Unquestionably, scientism¹⁰ and eugenics were premised on evolutionism and finalism, i.e. on a lopsided view of science and human-led progress, namely natural evolution transformed into historical evolution (Allen 1989) – as a panacea for all human ills. Such beliefs were accompanied by traits that we normally relate to the Counter-enlightenment, such as the widespread conviction that modernity is synonymous with mediocrity if not decay (Weingart et al. 1988). Enlightenment and Counter-Enlightenment schools of thought are thus equally responsible for its harmful consequences.

I also contend that the Human Genome Project and its applications cannot be immune from the perils afflicting the life and medical sciences in the past because all the aforementioned factors are still in place and only require a change in the historical circumstances to rear their ugly head. By the same token, scientists are not exempt from mistaking their own vested interests, biased values, creeds, and yearnings for those of the wider society but, unlike lay-people, their credentials hinder their capacity to acknowledge their own prejudices and fallibility (Jacobsen 2000), that is to say, their occasional

¹⁰ According to Pierre Thullier (Massin 1990) scientism is an almost blind faith in the cognitive and moral value of scientific knowledge

irrationality. If anything, it is reason to be systematically perverted by societal constrictions and ultimately Eugenio Scalfari is correct in asserting that it is a lack of rationality that modern society suffers from and not the obverse (Scalfari, 2001). Or perhaps what our present society is wanting in is reasonableness, understood as rationality tempered by common sense, *phronesis*, and mutual understanding. These virtues (*arête*) were most certainly absent in the eugenics rhetoric and, most importantly, do not enjoy much favour among leading geneticists and bio-technologists. But then again neither Bacon nor Descartes, that is the founders of the modern scientific method, ever felt it necessary to delineate any sort of code of conduct for responsible scientists. They did not even concern themselves with such issues as the value of human existence, the morality of the inquiry into the nature of mankind, the social responsibility of scientists. That was just beyond their scope (Haberer in Cerruti & Fazio 1976), and modernity was built also on this conspicuous absence.

1.1 THE LIFE SCIENCES AND THE PERFECTIBILITY OF MAN: REVOLUTIONARY SCIENCE AND PHRENO-MESMERISM

Können wir uns der Menge verweigern und doch Wissenschaftler bleiben?

Galilei to Andrea in Brecht's *Leben des Galilei*

The scientific approach to the examination of phenomena is a defence against the pure emotion of fear

Guildenstern to Rosencrantz in Stoppard's *Rosencrantz and Guildenstern are dead*

[science] wrote an end to the ancient animist covenant between man and nature, leaving nothing in place of that precious bond but an anxious quest in a frozen universe of solitude. With nothing to recommend it but a certain puritan arrogance, how could such an idea win acceptance? It did not; it still has not. It has however commanded recognition; but that is because, solely because, of its prodigious power of performance.

Jacques Monod as quoted by Dorothy Nelkin (in Mendelsohn 1977: 266)

The traditions of thought called romanticism and existentialism iconoclastically attacked the monistic belief that had dominated Western cultures for hundreds of years and according to which there had to be a single overarching truth, a single way to arrive at it, and a single way to administer society, i.e. bureaucratic rationalization. In a nutshell, these currents rejected scientific/rational determinism and mechanism – i.e. the tyranny of reason –, that had emerged as a result of Descartes' and Newton's theorising (Cohen & Smith, 2002; Cottingham 1992). The dynamics of this confrontation is precisely what shaped our contemporary society and culture. Therefore, Darrin McMahon's interpretation (2001: 200) of this phenomenon is all the more felicitous when he observes that

whereas the Enlightenment summoned its enemies into existence through its unprecedented attack on revealed religion, the Counter-Enlightenment in turn "created" the Enlightenment as the spectre and source of modernity's ills, reaffirming religion's place in the modern world and prescribing a program to heal it that was both idealistic and radical

Their common effort brought God to extinction. Indeed, God's death, a most insignificant event to a Confucian or a Buddhist, demolished the whole ethical apparatus founded on a monotheistic creed, its revelations, and its dogmas. The importance of this particular historical juncture cannot be overstated, in that owing to both tendencies man is reclaimed from myth and returned to his historical dimension in which he is at once encouraged to pursue the improvement of his condition, what we now call progress. Earlier on this would not have been conceivable:

The product of a supreme being (the argument goes), the world must have been created perfect. Improvement is thus unthinkable; the evil the universe contains must be necessary to it. [...] Thus all hope for progress is illusory.

Eichner (1982: 10)

The Enlightenment debunked such a view but the *philosophes* and their intellectual heirs unwittingly generated a propensity to look to science as the only solution to human predicaments. In order to escape from a form of irrational dogmatism some of them fell prey to another, no less pernicious form, which we name "scientism" and that, ironically, is just another form of fanaticism. It is my opinion that scientism cannot be fully understood without referring to the notion of human perfectibility and that eugenics arose out of this growing self-confidence and ambitious aspirations, feeding upon the belief in the perfectibility of man. This chapter explores the history of the belief in human perfectibility and in the attainment of happiness by rational means.

I believe the most intriguing interpretation of the relationship between the existence of evil and the ideal of boundless technical, moral, and biological advance has been made by Antonello La Vergata (Blanckaert, Fischer, Rey 1995).

He suggests that, for one thing, we should consider that the reason for the presence of evil in the world has never been easy to pin down to any mundane factor. When the first objections were raised against the existence of an infinitely wise, just and good God, it was suggested that man, though *faber* of his own destiny, is naturally lazy and prone to lapse back into animality unless challenged by the adversities. This was also thought to be what kept the civilizing progress alive, as human ascension and perfecting could not be achieved other than through painful trials and constant exertion. In fact it was assumed by many naturalists that pain and death propelled the economy (Kingsland 1988). This re-conceptualisation of history and historicization of nature – i.e. that the Creation and the Great Chain of Being was not immutable, let alone perfectible – clearly facilitated the diffusion of Darwinism (Lovejoy 1936; Outram 1997) and of a moralised and moralising interpretation of the Darwinian theories. It also favoured the diffusion of the cardinal principle of social Darwinism, i.e. the metaphor of the struggle for life. Several Darwinists proclaimed that their effort was aimed at the accomplishment of the universal aspiration of organic life to freedom, through the realisation of the ideal of human perfecting (La Vergata *ibid.*). Natural variability was then viewed as synonymous with moral freedom, teleological evolution was coterminous with moral obligation, and parasitism was mere moral apathy. Consequently, spiritual progress would go hand in hand with biological progress, that is physical improvement was equivalent to spiritual refinement. Thus the struggle for life was not necessarily merciless and sadistic, it actually pushed living beings to improve themselves, to adapt, and to fare better. The most committed that is, the most successful, would be rewarded in this life, a moral exigency that is remarkably in tune with the protestant and Calvinist work-ethics. The conclusion of La Vergata is that there seem to exist ideological compounds that stand the test of time and even contrive to live through scientific revolutions. It stands to reason that one of the strongholds of such a doctrine must necessarily be that individual human beings cannot be faulted for choosing the wrong path. Evil stems from natural circumstances over which individuals have no power, so that a modern scheme of social reform could only be successful provided that it comprised a prophylactic approach to the structural causes of social ills, and therefore presupposed the direct intervention of the State (Colla 2000).

Besides the overcoming of evil and social ills, the other cardinal concern of the Enlightenment intellectuals was how to achieve individual and collective happiness. The modernizing spirit they propagated in the course of the 18th century involved a positive conviction that universal happiness was within reach by means of bold social reforms. Happiness was the main subject of thousands of epistolary exchanges of men and women fascinated by the wealth of opportunities made available by the new cultural climate (Roger in Ferrone & Roche 1997). The reason for such a keen interest can be easily grasped by reflecting on the epochal change of perspective that had followed the above mentioned explosion of the dogma of the original sin – partly occurred as a consequence of the indescribable cataclysm that had visited Lisbon in 1755¹¹ and had profoundly disconcerted Voltaire –, which explained why happiness was so hard to attain in this world. Following such an occurrence, it became more difficult to look to humans as naturally depraved and both the Christian taboo on sensualism and the corresponding favour in which the mortification of the flesh was held lost their meaning (Porter 2000). That of pleasure as an end in itself became a legitimate pursuit (Porter 2000). But if the original sin was only a fairy tale, and grace could no longer be seen as the only means to attain happiness (McIntosh 1992), then unhappiness was an evil to be redressed. Simultaneously, the quest for happiness outside of a framework of religious, transcendent commandments could translate into a selfishly hedonistic pursuit à la Sade (Roger in Ferrone & Roche 1997), grounding morality in mere personal interest (McMahon 2001).

It was necessary to re-moralize happiness, and the typical solution of the Enlightenment was the emphasis on public spirit, on a civic religion that would replace popular religiousness. This secular religion was to revolve around the notions of social utility equating the good with the pleasurable and of cooperative exertion aimed at boundless progress and the general betterment of life-standards (Roger in Ferrone & Roche 1997). Accordingly, Cesare Beccaria's seminal

¹¹ a huge earthquake followed by three tsunami waves and several fires causing 60,000 victims

formulation of criminal law disallowed a religious foundation to evil and promoted the idea of a humanistic society administered according to rational and statistical criteria and averse to utopianism. Only such an arrangement could establish truly egalitarian social relations (Venturi 1970)

In his Two Treatises on Civil Government, John Locke argued that the three fundamental natural rights are:

- the right to life
- the right to liberty
- the right to property

Governments were expected to preserve these natural rights by virtue of a covenant between citizens and the head of the State that was rooted in the teachings of the Enlightenment thinkers (La Berge 1992). However, in keeping with the true spirit of the Enlightenment, the pursuit of happiness became central to the American declaration of independence. The drafters of the American constitution replaced the third Lockean natural right with the right to happiness (Teichman & Evans 1991). The other mainstay of the Enlightenment philosophy was that the progress of knowledge would prove that human nature is not subject to the laws of necessity but alterable and therefore perfectible (Widmann 2001), another stronghold of eugenics.

Judging by his 1791 report to the Constituent Assembly, I guess Talleyrand was well aware of the powerful effects of human planned intervention on the social and the natural. He wrote that *un des caractères les plus frappants dans l'homme est la perfectibilité, et ce caractère sensible dans l'individu l'est bien plus encore dans l'espèce* (Dhombres 1989). In fact, it is precisely with the French Revolution and its mobilisation of savants that science is designated as the principal instrument of mankind's progress and betterment. Although it was held as likely that humans had not been created naturally good, knowledge of nature and science could make them so (La Vergata 1990). Obviously this was a view that had not been entirely grasped by the masses, let alone shared. The idea of human beings taking charge of their own destiny and of science as indispensable to the pursuit of happiness and prosperity remained a markedly bourgeois belief or rather, in the words of Ann Goldberg (1999: 40):

a bourgeois Biedermeier sensibility of orderliness, moderation, self-discipline, and Gemütlichkeit ["sentimental good nature"]. [...] Self-mastery over an internal "other" – over the irrational forces of the ego – was a quintessentially bourgeois value closely connected, as it has been suggested, to the insecurities and aspirations of a social class forming itself outside of and against the traditionalist corporatist order

Consequently what took shape was a bourgeois ethos of individual responsibility and self-fulfilment sustained by the medicalization of social life and morality that overruled the traditional bonds of sin and miracle (Goldberg *ibid*). When the values of the middle class became hegemonic this hodgepodge of ideals, inclinations, aspirations, and whims we now call progress turned into the driving force of Western societies, and charmed countless political leaders. Take Napoleon who, on sailing back to France from Egypt, commented (Dhombres 1990): *Je me trouve conquérant en Égypte comme l'y fut Alexandre; il eut été plus de mon goût de marcher sur les traces de Newton.*

Subsequently, progress as an emancipatory and fulfilling process acquired the traits of a mundane religion and as a result everything undertaken in its name was ethically good, legitimate, and above suspicion (Kappeler 2000). This ideology eventually combined with three further themes that German romantic philosopher Herder had interrelated within his philosophical edifice. I am referring to decadence, to the idea that people are parts of an organic totality, and to the partial dissolving of history into natural history, all of which would loom large into the eugenics discourse (Thomas 1995). Eugenists could then interpret the role of "exemplary children of the Enlightenment" (Watts 1994).

We thus see that three seemingly different but really complementary views of science have co-existed ever since the birth of modern science:

- science as a faith;
- science as a political engine;

- science as a pedagogical and civilising tool;

These three undercurrents equally contributed to the prevailing of a concept of science as indispensable to a country's pursuit of happiness and prosperity. Maupertuis (1698-1759) stressed that happiness was the natural goal of human beings and that this very goal had to direct one's conduct and the selection of what is worth striving for (Hervé Hasquin in Van de Vyver and Reisse 1991). This resolution was accompanied by the necessity to popularise it as broadly as possible. During the French revolution the motto became *sanculotiser la science*, that is to bring science to the masses. A revolutionary scientist, Decremps, maintained in 1794 that the jargon of science had to be translated into plain language because *il n'y aura pas grand avantage d'être savant quand il sera permis à tout le monde de le devenir* (Dhombres in Van de Vyver and Reisse 1991: 33). Encyclopaedias, scientific magazines and university courses were instituted to meet this need, for citizens were to be educated on how to build public spirit and civic participation.

Enlightenment is man's release from his self-incurred tutelage. Tutelage is man's inability to make use of his understanding without direction from another. Self-incurred is this tutelage when its cause lies not in lack of reason but in lack of resolution and courage to use it without direction from another. Sapere aude! Have courage to use your own reason!- that is the Enlightenment's motto

This is Kant's definition of Enlightenment as published by the *Berlinische Monatsschrift* in 1784. His text, brief and slightly unsystematic, emphasises the rupture with the previous historical period, a cleavage that had been formed by alterations in the way the use of reason and authority was perceived. In lieu of the "cog-in-the-machine" model of social behaviour, Kant advocates the public use of reason and the recovery of the agora, a public and open debate that would yet averse the subversion of the legitimate authority, i.e. a system of rational despotism¹². Interestingly the Birmingham chemist James Keir in 1789 proclaimed that *the diffusion of knowledge, and a taste for science, over all classes of men, in every nation of Europe, or of European origin seems to be the characteristic feature of the present age* (Stewart 1998). Likewise, in the 18th century the early practitioners of science accepted the cardinal mainstay that the access to truth and knowledge ought not to be restrained to initiates but rather be virtually open to everyone. According to Descartes, Hobbes, and Leibniz, everyone is endowed with the gift of reason and is consequently able to tell good from wrong. This was the basic assumption of the Cartesian method and was enlarged by Mersenne, who held that a man can do everything that another man can do and that everybody possesses all that it takes to philosophise and reason about all things (Rossi & Ferrone 1994). This stance was clearly political as exemplified by von Pufendorf, who believed that authority earned by birth was meaningless as the right to impose an obligation derives from one's own principles (Rossi & Ferrone, *ibidem*). As a result, the top ranks of society were compelled to find different means to induce their subordinates to conform to their will and the medicalisation and scientisation of society turned out to be the finest solution. This resolution involved a trend towards the reinterpretation in bio-medical terms of internal and external threats to the social structure. As scientific research became more complex, requiring more effort and more funding, and proved its importance in the promotion of a nation's power and prestige, kings and princes transformed a private, almost amateurish undertaking into a profession that served the objectives of the State. No sooner did science become institutionalised and become popular and successful that the men of letters protested against the passive enslavement of science to the will of the ruler and against the corporatism that had come to dominate the academe and the cultural life of their respective countries. Already by the late XVIII century Vittorio Alfieri in his *Del principe e delle lettere* (1983 [1778]) described the cleft that had formed between humanities and sciences. After observing that, by contrast with the laws and passions of man, the laws of matter do not threaten the establishment, he juxtaposed the independence of thought of the man of letters who is in a position to denounce despotism and educate the people, and the acquiescence and sycophancy of scientists craving funding, protection, and patronage.

This is also the reason why French revolutionaries placed so much stress upon the liberalization of knowledge and expertise. Inevitably, given the huge stress they placed upon egalitarianism, Jacobins came to view science as a task for

¹² A statement attributed by Kant to Frederick the Great was: *argue as much as you like and about whatever you like, but obey!*

courtiers, an aristocratic subculture, as it were, whose technical jargon distanced the broader population from the truth. Thus Brissot de Warville in 1782 published a pamphlet tellingly entitled *De la vérité* in which he stated that formerly intellectuals had not been deemed as such *par brevet* and that only *les modernes ont introduit dans l'empire des sciences une espèce d'aristocratie élective* (Ferrone & Rossi 1994: 115).

At the same time their very popularity backfired on a new generations of scientists who got involved in public demonstrations of dubious scientificity. Some newspapers and most academicians began deriding the latest "scientific fashions", such as mesmerism (animal magnetism), dowsing, and physiognomy, the discipline founded by the Swiss Protestant pastor Johann Kaspar Lavater (1741-1801) who held that physical appearances revealed someone's temperament, virtues, and intelligence. This sudden return to pre-Enlightenment practices of a pseudo-scientific kind was arguably due to the intricacy of science itself that was drifting away from the comprehension of the man in the street. Universal rationality was no longer sufficient to master the Galilean-Newtonian method and scientists had eventually cut themselves off from the rest of society. Their research was not manifestly relevant to the concerns of lay-people and there was a growing feeling that the academes *nuisent à la recherche de la vérité* (Brissot de Warville, 1782, as quoted by Ferrone & Rossi 1994: 115).

It was the very triumph of science that laid the foundations for this internal struggle, which in turn was simply the upshot of a crisis of growth and of the reaction to the despotism and arrogance of the privileged and their esprit de corps, accused of hampering free inquiry and aiming at the monopoly of knowledge. The theoretical and paradigmatic clash that followed a veritable crisis of identity affecting several young aspiring scientists marked the beginning of the modern epistemology of science, namely the study of what science is and what is not and who is entitled to decide on such issues. Many scientists, despite being stubborn rationalists, explored different avenues and as a result science broke in two, official science and popular science, whose respective exponents called each other charlatans.

As mentioned before, at that time two popular disciplines were physiognomy – the study of facial somatic traits – and phrenology – the study of the shape of skulls – whose practitioners pretended they could prove that anatomical and physiological characters had an influence upon moral proclivities and intellectual capacities and that their expertise could be essential in the struggle for education and against crime and insanity (Davies 1955). It is to these two branches of what we nowadays define pseudo or occultist sciences that we can trace back the roots of that utilitarian vision of ultimate perfection that periodically resurfaces within the life-sciences. The founder of phrenology, Franz Joseph Gall (1758-1828), remarked that phrenology could provide the elite with the means by which the masses would be governed rationally and therefore effectively. Gall believed that the brain functions were the ultimate responsible for human behaviour, temperament, and intelligence and that moral dispositions and intellectual faculties were innate¹³. Consistent with his search of normal and pathological hallmarks rather than attributes common to the entire human species, he recoiled from Enlightenment egalitarianism (Lombardo & Duichin 1997). He did so probably on account of the education he was imparted by the religious institute that he attended as a pupil, where his teachers admonished him to bear in mind that talents were God given and that each one of them was expected to honour a tacit contract with the Providence and make the most of those gifts (Temkin in Lombardo & Duichin 1997). This belief in a divine order pervading the Creation and rendering it immutable was arguably one of the chief determinants of his anti-historical approach to biological and social change (Temkin *ibid.*). This conviction that there was not such a thing as a progressive, appreciably consistent improvement of humankind, as I will show in the course of my research, was also shared by most eugenicists. Ironically, despite his hostility to those scientists who try to blend science and religion, the actual with the transcendent, the worldview he advocated was germane to the traditional dogma of the original sin that so vehemently was being attacked by the exponents of the Enlightenment. The only real divergence was the emphasis placed by phrenologists on crime as a disease rather than disease as an expression of sin. But then again Gall was anything but a sympathiser for the cause of proletarian emancipation. On

¹³ this sense it is not too far-fetched to regard him as the forerunner of Lombroso (Temkin 2002).

the contrary, he was well known in the aristocratic circles and one of his patrons was the count of Metternich. He also barely concealed his contempt for the mediocre intellectual faculties of the man in the street and claimed that some people were born to lead and others to obey (Temkin *ibid.*).

The above mentioned religious tinge was even stronger among two of his followers, Johann Gaspar Spurzheim (1776-1832), and George Combe (1788-1858), a lawyer from Edinburgh. While Gall failed to popularise his discipline in the Anglo-Saxon context, they were remarkably successful precisely because they underscored its religious component. Spurzheim, who had studied theology, argued that phrenology would reveal the purpose of God in creating mankind (Davies 1955) and both Combe and Spurzheim managed to convey the crucial message that phrenology as a scientific perspective on human nature was chiefly concerned with social meliorism without constituting a threat to the status quo (Temkin in Lombardo & Duichin 1997). These two thrusts within the same current of thinking are extremely significant because they reflect the two main aims of the subsequent eugenics movement, namely social control (bio-politics) and the perfecting of Creation (utopianism). More, their successful co-existence witnesses to the hybrid character of phrenology that consisted of an eminently Romantic outlook, stressing notions such as organism, holism, struggle (*Streben*), and uniqueness (*Eigentümlichkeit*), framed in a positivistic methodology (Jason Y. Hall in Lombardo & Duichin 1997). Like eugenics thereafter, it is safe to say that phrenology was the expression of a romantic positivism, or positivistic romanticism (Hall, *ibid.*).

Much in the same way as eugenics, socio-biology, and evolutionary psychology, phrenology managed to catch on because of its oversimplified techniques, demonstrations, postulates and theories, entirely foreign to what was termed “academic pedantry” by phrenologists themselves, and which were easily graspable by the lay-public:

In the course of his ordinary duties he must, as a priest, listen to confessions and give advice on spiritual subjects, as physician give advice on health, as a judge with acuteness decide between contending parties. Besides regularly acting in this triple capacity, he is often a mesmerist, a medical electrician, an hydropathist, a psychologist, and astrologist

Phrenologist J.J. Spark (Cooter 1984)

Although Gall was by no means a racist and maintained that there existed a substantial unity of mankind and to some extent romantically idealised primitive life (Gliozzi 1990), in the course of time phrenology became a reactionary and race-biased enterprise that subsequently heavily influenced the nature of eugenics. Phrenologists were the first to “scientifically” lay the emphasis upon the inheritability of physical and mental qualities and to combine a set of beliefs that were to play a major role in the successive eugenics discourse. These were a belief in progress, in biological determinism, in the alterability and perfectibility of human nature, and in the progressive degeneration (*Entartung*) caused by the civilizing process (Hilts 1982). Some of their most cherished beliefs were that inferior races would never catch-up with the progress of British intellect; that slavery was to be abolished because intellectually inferior slaves threatened to harm Britain; and that women were ill-equipped for abstract thought (De Giustino 1975).

Although the influence of phrenology and mesmerism upon the “official” scientific discourse was to be enduring, mass-consumption and the gradual transformation of phrenology into a self-help panacea that did not require extensive training, inevitably caused the corrosion of the authority of professional physicians and scientists who in turn began to question its reliability, although at that time no empirical evidence could be gathered to prove that they were unscientific:

American intellectuals had more concrete and compelling reasons for abandoning these movements. Mesmerism and phrenology alarmed many of them because both sciences promoted unorthodox or radical views on religious, scientific, medical, and social issues.

McCandless (1992: 228)

Indeed phrenology, as well as competing with positivism, acted as an intermediary between this latter and the occultist, hermetic, Neoplatonic traditions, and further undermined conventional views. Idealistic overtones were frequent

in the phrenomesmeric rhetoric, and it has been emphasised (Mocek in Bayertz & Porter 1998: 226) that it had several principles in common with socialist utopianism:

- man's potential for plasticity;
- man's potential for reintegration in cosmic harmony;
- the dependence of man's nature on circumstances;
- its criticism of soulless machinery;

and with proletarian biologism¹⁴ (Mocek 2002: 394):

- self-fulfilment cannot be achieved without exertion, namely by working hard, cultivating a *Freikörperkultur* (the culture of a healthy body), and constructively interacting with nature and the other human beings
- inborn flaws stand in the way to the attainment of innate human longing for freedom, love, truth, happiness and health
- although biology and the social milieu determine human existence, exertion may enable people to overcome their shortcomings
- all institutions aiming at the emancipation of workers must keep into account human physiology
- it is not the species but the individual that should lie at the centre of human research. However, individuals must be aware that it is their duty to employ their advantageous attributes to improve the efficiency of the wider society

In brief, phrenology was an easy philosophy, expressed in ordinary language, a guide to reform and to knowledge, a new basis of morality, a promise of order and progress in turbulent times, magical and slightly mysterious, precise but flexible, awesome in judgement and yet humanely hopeful (De Giustino 1975: 74). Traits that it shared with its outgrowth, i.e. eugenics, and that made it remarkably adaptable to antagonistic ends (Staum 1995). Like eugenicists, British phrenologists sought to influence the choice of suitable marital partners and to prevent the transmission of physical, mental and moral shortcomings by recommending the adoption of legal measures governing human mating (Waller 2001). In a nutshell, they endeavoured to convey the message that individual infirmities were social infirmities and had to be treated as such, that is, they required large-scale social interventions (Waller 2001).

Again like eugenics thereafter, phrenology also justified urban utilitarianism and individualist meritocracy against natural privileges, especially on account of the fact that most of its practitioners worked at the margins of the official science and their social place was quite ambiguous, so that they longed for recognition and for their acceptance into higher social ranks (Cooter 1984). The development and demise of phrenology cannot thus be disassociated from the exploits and setbacks of a burgeoning industrial capitalism. Popular sciences or pseudo-sciences were to become props for the claims of a dissatisfied bourgeoisie, which perceived that a duly proportionate political power should ensue its growing economic power. An aristocracy of talent was to replace the aristocracy of birth. In the end, phrenologists shifted their focus to hereditarianism – and they were the first to clearly focus on the inheritability of physical and mental characters by disputing the Lockean tenet of the *tabula rasa* as well as the Enlightenment doctrine of equality at birth (Lyons 1998) –, control of reproduction, and racial degeneration, a move instrumental to the exclusion of lower classes from the privileges attained by the bourgeoisie, and this led the movement to merge with the nascent eugenic schools of thought (Cooter 1984). Ironically, what had started as an attack on the natural rights of the dominant classes wound up backing up the claims and the ascetic virtues of the parvenus and deploring the sensuality of the Negroes and of the members of the working class. Their legacy

¹⁴ In Germany, theorists of proletarian biologism, though sharing the presupposition that Western civilization was socially and biologically decaying, differed from the advocates of bourgeois biologism in that they strove to humanize science and profit from its advance to emancipate the working class and radically reform society by virtue of the genetic and phenotypic enhancement of workers and the betterment of working conditions (Bayertz 1983; Mocek 2002)

was an enduring one, though, and with the benefit of hindsight we now know that it exerted a crucial influence upon eugenics:

It...established in the public mind the notion that human behaviour was capable of classification and measure and that social, economic, and intellectual success, on the one hand, and problems of crime, delinquency, and addiction, on the other, could be reduced to organic derangement of brain

Roger Cooter (1984: 270)

The same could be said of mesmerism, a "scientific" movement founded by Austrian physician Anton Mesmer (1734-1815), who claimed that animal and mineral magnetism could be harnessed to therapeutic ends. Robert Darnton has defined mesmerism *Enlightenment run wild, which later was to provoke a movement toward the opposite extreme in the form of romanticism* (Darnton 1968: 39). I am rather inclined to look to phreno-mesmerism as the point at which radical tendencies present in both Enlightenment and Counter-Enlightenment met, which would account for the fact that it appealed to so many protagonists of the French Revolution, from Marat to Duval d'Éprémesnil (Darnton *ibid.*). Thus for example Brissot wrote a pamphlet in which he championed mesmerism with an almost religious devotion (Darnton *ibid.* 97):

Don't you [academicians] see, for example, that mesmerism is a way to bring social classes closer together, to make the rich more humane, to make them into real fathers of the poor? Wouldn't you be edified at the sight of the most eminent men...supervising the health of their servants, spending hours at a time mesmerizing them?

1.2 THE PRODROMES OF EUGENICS

Aus so krummem Holze, als woraus der Mensch gemacht ist, kann nichts ganz Gerades gezimmert werden

Immanuel Kant, 1784, quoted in Berlin (1990)

Call it what you will; but if your aim is to use scientific methods to make the best of the inherited component of the health and wellbeing of the children of the next generation, it is by definition eugenics

David Galton (2001: XIII)

We're using exactly the same kinds of techniques used by evolution, but what we're attempting to do, in a thoughtful and rational way, is to facilitate evolution, so it doesn't operate in a blind fashion...but in an optimising fashion

Leroy Hood, molecular biotechnologist, University of Washington (Stock & Campbell 2000: 92)

This is an incredible concept: that our species has the ability to self-evolve

Lee M. Silver, molecular biologist, Princeton University (Stock & Campbell 2000: 95)

We have seen that the common denominator of these doctrines was the belief that health and social order were two faces of the same coin and could be restored by scientific means. Indeed, the rhetoric of therapeutic intervention upon a sick society was not a peculiarity of National Socialism (Gay 1969). The medicalization of society probably started when a growing number of physicians, emboldened by the steady advance of their discipline, sought to present the Enlightenment as a medical matter (Vila 1998). Paraphrasing Kant's famous definition, German physician Johann Karl Osterhausen described medical Enlightenment as *man's emergence from his dependence in matters concerning his physical well-being* (Gay 1969: 17).

Many *philosophes* were very sympathetic to medicine which they viewed as a testing ground for their theories and some were physicians, surgeons or had a medical degree (Gay in Barber & Brumfitt 1967). Nevertheless, whereas philosophers did not really concern themselves with biological inheritance, because they assumed all men to be equal at birth, several prominent physicians, more pragmatically oriented, embraced a militant conception of medicine (Moravia in

Cabanis 1981). They were ready to make value judgements on diversity as well as to endorse public policies aimed at the prohibition of marriage between mentally or physically unfit individuals and the arrangement of suitable mating (Victor Hiltz in Mendelsohn 1984). The outcome was a schism between Enlightenment empirical science and Enlightenment egalitarian ideals that has lasted to this day, with scientists predicting that some day science would replace religion as a source of ethical guidelines, and humanists responding that certain basic human values must be held regardless of the cogency of scientific theories (Hecht 1999).

In France this current of thinking propagated those interrelated tenets that have never since disappeared from the scientific debate (Vila 1998):

- that mind and body are interdependent and malleable and that by acting on one it would be possible to effect changes upon the other
- that the gap between physical and moral can be bridged by medical and scientific means
- that ameliorating the human species and arrest its deterioration is a duty
- that medical specialists should be in charge of these alterations

Antoine Le Camus (1722-1772) was one of the first physician-philosophers to state that ethics and health were closely related (Vila 1998: 85):

We claim, through purely mechanical means, to make any man a superior thinker; or, to put it differently, to provide his soul with all the solidness and brilliance that he wishes

His meliorist social scheme also recommended that society should be reformed so that fitter men would attend to their procreative duties and that "regiments of malformed men" should be sent off to the front in lieu of the healthiest individuals (Vila, *ibid.*). These contentions would be resumed by French revolutionary Bergasse, who argued that the best way to revolutionize France would be by improving the bodies of its citizens, as better bodies would improve morals and better morals would positively effect French politics (Darnton 1968), but also by Alfred Ploetz, the founder of German racial hygiene (Mocek 2002).

Consistent with Bacon's prediction that scientists would alter the life cycle of edible plants, interbreed and create new species (Tokar 2001), in 1756 French physician and hygienist Charles Augustine Vandermonde (1727-1763) wrote the *Essai sur la manière de perfectionner l'espèce humaine* in which he expounded his dream of perfecting agreeable human talents and weeding out disagreeable and disadvantageous traits by rationally administering human breeding. This whole thesis was by necessity founded on the postulate that spiritual and temperamental qualities are inheritable, one that echoes phrenologists' convictions (Wellmann 2001). Vandermonde made it clear that he would like to witness the effects of the selective breeding of children for white skin, artistic talents, and all those faculties that society finds pleasing (Vila 1998: 90). As fate would have it, one year later the first eugenic law was adopted by Sweden in order to prevent the marriage of epileptics (Testart 1994).

Ambroise Condorcet (1743-1794) and his disciple and friend Pierre Jean Georges Cabanis (1757-1808) believed that natural inequality was not necessarily at variance with the doctrine of equal rights, because these could be achieved by breeding equal human beings, which required a state wholly regulated on both a social and a biological plane and a universal science comprising humanities, natural sciences, and theology (Vondung in McKnight 1992). Condorcet (1970), whose motto was *tout ce qui peut contribuer à rendre les individus plus indépendants est un bien* (Testart 1994), observed that the rights of the unborn children involved their happiness and well-being as well as the good of the society in which they will live and not *la puérile idée de charger la terre d'êtres inutiles et malheureux*. In his *Fragment sur l'Atlantide* (1793) he proposed in furtherance of this aim the establishment of an association of scientists-pedagogues, a *clergé scientifique*, who would fulfil the Baconian dream of a communal endeavour to dominate nature. In the *Ouvres Philosophiques* Cabanis (Cabanis 1956, Tome I: 356-357) substantially

summarised most of the theses eugenicists would later espouse, although, given the means available in his times, he confined his hopes to the realm of euthenics amelioration:

Après nous être occupés si curieusement des moyens de rendre plus belles et meilleurs les races des animaux, ou de plantes utiles et agréables... combien n'est-il pas honteux de négliger totalement la race de l'homme! ...comme s'il était plus essentiel d'avoir des bœufs grands et forts, que des hommes vigoureux et sains; des pêches bien odorantes, ou des tulipes bien tachetées, que des citoyens sages et bons! Il est temps... de suivre un système de vies plus digne d'une époque de régénération: il est temps d'oser faire sur nous-mêmes, ce que nous avons fait si heureusement sur plusieurs de nos compagnons d'existence; d'oser revoir et corriger l'œuvre de la nature

What I find disturbing is the parallel which can be drawn between this statement and what the commentator of the periodical "Jung Deutschland" wrote in 1902 (Mann & Winau 1977):

Es giebt Vereine zur Züchtung reiner Pferderassen, reiner Hunderassen, ja sogar reiner Schweinerassen. Hat jemand wohl schon etwas von der Züchtung reiner Menschenrassen, in unserm Fall von der Züchtung eines reinen deutschen Edel-Volkes gehört? Wäre dies nicht nabeliegender, nicht notwendiger, nicht klüger gehandelt als die Züchtung reiner Schweinerassen?

[there are associations for the breeding of purer races of horses, dogs, and even pigs. Did anybody ever heard of the breeding of purer human races, in our case the breeding of a purer, German noble stock? Should not that be more obvious, necessary, and judicious than breeding pure races of pigs?]

Probably as a result of this intermingling of utopianism and social medicine, Galtonian scientific eugenics was actually preceded by what Léonard (1992) and Carol (1995) call medical eugenics, more inclined to an environmental outlook stressing the importance of the most advantageous circumstances for the reproduction (Drouard 1999). These proto-eugenicist thinkers resumed the Renaissance ideal of a state wholly regulated on both a social and a biological plane that was to serve as a blueprint for the future political agenda of eugenicists (Hilts in Mendelsohn 1984). Here is where the slippery slope argument truly applies, in that these seemingly humanitarian purposes, the accompanying effort to reconcile natural laws and the Enlightenment ideals of liberty, equality, and fraternity, and the intoxicating task of making sense of a world in which God had passed away as scientific progress had gathered momentum, eventually drove some biomedical scientists towards a totalist and nihilist mode of thought (Repp 2000). Eugenics issued from a class-conscious mentality that transformed what could potentially be a reforming and equalizing movement into a threat to the very survival of many downtrodden individuals and social outcasts.

By way of a summary, these are the attributes that phrenology and eugenics had in common (McLaren 1974, 1981):

- The belief that human nature is malleable and perfectible and that virtues can be cultivated and vices weaned off given that the doctrine of the original sin is a sham
- the belief that human faculties are innate and, beginning from the second half of the 19th century, that criminals belong to a different class of humans and are not entitled to full citizenship in that their degeneration is irreversible
- an utilitarian and deceptively simple approach to the social question that glosses over the intricacies of modern society and therefore appeals to the lower classes
- a crude conception of evolution in which the bourgeoisie has reached the evolutionary apex and should serve as a model for the other social categories.
- their appealing to both conservatives looking for new means of social control and to progressives promoting across-the-board social reforms

2. SCIENCE, MEDICINE AND BIO-POLITICS

Une société normalisatrice est l'effet historique d'une technologie de pouvoir centrée sur la vie

Michel Foucault (1976: 190)

Il sovrano entra in simbiosi sempre più intima non solo col giurista, ma anche col medico, con lo scienziato, con l'esperto, col prete¹⁵

Giorgio Agamben (1995: 135)

Le but de la morale future sera uniquement de formuler des règles, de créer des penchants compatibles avec la plus grande somme possible de bonheur public et privé, c'est-à-dire de rendre l'homme plus robuste, meilleur et plus intelligente. Tout ce qui pourra concourir à cette œuvre sera moral; tout ce qui y contredira sera réputé immoral.

Charles Letourneau, *L'évolution de la morale*, 1887¹⁶

Before getting into the intricacies of bio-politics, it is of the essence that we review a few important facts about contemporary pharmaco-genomics and bioethics, for this will help the readers understand why bio-politics itself is an exceptionally pertinent and crucial topic, and will become more so in the years to come.

1. We are being repeatedly assured that technology is neutral, although it should appear as self-evident that certain technologies have a greater impact upon society, may require a greater intervention by the State in the private sphere, and may provide a different degree of accessibility to its potential users
2. Another tenet that is being promoted is that genes are us. There are genes for everything, from obesity to schizophrenia, and from intelligence to homosexuality, and if you inherit a copy or two, depending on whether they are recessive or dominant, you will be dumb or gay accordingly. The entire Human Genome Project was based on the false assumption that the sequencing of human DNA would provide ready-to-use information and on the deliberate disavowal of systems biology and epigenetics¹⁷.
3. Much of the current bioethical debate seems to be dominated by the attempt to formulate a universal ethical framework applicable to all pluralistic societies, ultimately stifling any meaningful democratic confrontations. This universal code would revolve around utilitarian considerations, stressing the goals (e.g. betterment of individual existence) and ignoring the broader social consequences of the pursuit of such goals (e.g. social justice, solidarity). Since the unintended consequences of individual actions are not easily calculable, they tend to be regarded as negligible.
4. Correspondingly, numerous scientists and bio-ethicists seem to agree that the only real problem we face in the genomic era is how to guarantee safety and informed consent, not how to deal with conflicting interests and powers, as well as persistent prejudices and beliefs. If a technology is safe, so runs the argument, then it is perfectly acceptable. The trouble with bioethics as conceived today is that it tends to facilitate the growth of biotechnologies, rather than disciplining their applications, and that it justifies individual wishes and desires to the detriment of social justice and the common good: *ethics is generally taken seriously by physicians and scientists only when it either fosters their agenda or does not interfere with it. If it cautions a slower pace or a more deliberate consideration of*

¹⁵ [The sovereign forms an increasingly intimate symbiotic connection not only with the lawyer but also the doctor, the scientist, the expert, the priest].

¹⁶ As quoted by Anne Carole 1995: 245.

¹⁷ <http://www.sciencemag.org/content/vol293/issue5532/#specialintro>.

science's darker side, it's dismissed as fearful of the future, anti-intellectual, or simply uninformed (George Annas 1989, EGS 2001¹⁸).

5. Critics urging that a greater attention be directed to the part played by emotions, traditions, and habits when it comes to predict individual decision-making vis-à-vis reprogenetics are often dismissed as irrational and backward and unworthy of consideration. The same labels apply to those (e.g. Nobel Prize winner Amartya Sen among others) who point out that genetically modified crops cause small farmers to depend on major corporations, and ignore the problem of why in some countries overproduction of food can go hand in hand with malnutrition (e.g. India). By the same token, those who suggest that vaccines, nutrition, education, and decent working conditions could do far more good to society than expensive treatments and selective abortions are dismissed as reactionaries. That pharmaceutical and cosmetic industries are obviously targeting consumers who can afford their services and care little about the rest of the population is a fact that is seldom taken into consideration.
6. The advocates of germ-line engineering, also known as inheritable genetic modification (IGM), are becoming increasingly vociferous. They claim such techniques are needed for they will allay people's suffering and prevent wrongful births. They do not explain that the same goal could be attained through PGD, or pre-implantation genetic diagnosis – i.e. in vitro fertilization plus cell-testing and the insertion in the woman's uterus of exclusively healthy embryos –. IGM has no useful therapeutic aim and it is championed only by those who wish surreptitiously to advance the eugenic agenda.

This is the current scenario, and we need to keep it in view so that we may now proceed to explain what is generally meant by bio-politics.

In *Surveiller et Punir* (1975) Foucault describes how, beginning from the eighteenth century, two crucial social changes occurred. One was the introduction of the *technologie politique du corps*, by which Foucault meant the knowledge of the body, which goes beyond mere observation, and the mastery of its functions. The second change, closely tied to the first, was the broad diffusion of dynamic power-relations among societal agents, that Foucault called *microphysique du pouvoir*. In other words, power does not belong specifically to anyone, but depends on his or her strategic position within society; it consists in the whole of those relations that operate through individuals' roles, bodies, and expertise. Both factors are involved in the perpetuation of social control due to the internalisation of those patterns that legitimize a specific hierarchical distribution of power, that is, of worldviews based on a corresponding distribution of ideas about what is true and what is not – in other words, what Foucault defines as an "economy of discourses of truth" (Michel Foucault 1980).

One of the central tenets of Foucault's thinking is precisely that there is no power relation without a corresponding field of knowledge that sustains it via internalisation of norms and values (Michel Foucault 1975). Power generates knowledge and vice versa. It follows from this premise that "objectivity" is a construct instrumental to the conservation of those power-relations that shape hermeneutic and epistemological canons (cultural codes) (Foucault, 1975; 2001). On a macro-level, bio-power is the range of legislative measures that replaced the sovereign's prerogative to rule on matters of life and death by disciplining the biological fields of procreation, illness, accidents, etc. ("disciplinary technologies") through the systematisation of knowledge.

Ce formidable pouvoir de mort...se donne maintenant comme le complémentaire d'un pouvoir qui s'exerce positivement sur la vie, qui entreprend de la gérer, de la majorer, de la multiplier, d'exercer sur elle des contrôles précis et de régulations d'ensemble. Les guerres ne se font

¹⁸ *Ethics, Genetic Technologies, and Social Responsibility in the Twenty-first Century*. A Panel Discussion Held on March 14, 2001 at the Townsend Center for the Humanities, University of California, Berkeley

plus au nom du souverain qu'il faut défendre; elles se font au nom de l'existence de tous; on dresse des populations entières à s'entre-tuer réciproquement au nom de la nécessité pour elles de vivre.

Michel Foucault (1976: 180)

The problem with Foucault's reading of the history of bio-politics is that he was forced by the intricacy of the issues under scrutiny to oversimplify them and expose himself to the scathing critiques of specialists such as Paolo Rossi (Rossi 1995) and Charles Taylor (Taylor 1984):

I postmoderni pensano che la modernità sia caratterizzabile come l'età dell'autolegittimazione del sapere scientifico e della piena e totale coincidenza fra verità ed autoemancipazione. [...] Pensano anche che il moderno sia l'età di una ragione forte dominata dall'idea di uno sviluppo storico del pensiero come incessante e progressiva illuminazione. Pensando queste cose hanno pensato male. Hanno affermato cose banali che, avendo l'aria di essere epocali, appaiono profonde ai poveri di spirito. Non hanno letto i moderni, ma i manuali che parlano di essi. Sulla base di questa lettura hanno trasferito all'indietro e proiettano in avanti (fino a farla coincidere con l'intera modernità) quell'ottocentesca ideologia "comtiana" del progresso che solo per un breve periodo (fra il declinante secolo decimonono e gli inizi del ventesimo) è liberata dai molti problemi, dalle forti ambivalenze, da tutte le sue complicazioni interne, diventò "la fede media della intellettualità europea e delle classi dirigenti.

Rossi 1995: 112

[Postmodernists think that modernity can be typified as the age in which scientific knowledge legitimised itself and the age of the full and absolute coincidence of truth and self-emancipation. [...] By thinking so they got it all wrong. They have argued trivial things that, looking as if they were epoch-making, appear profound to simpletons. They have not read the modern authors, but the handbooks that deal with them. On that basis they have projected backwards and forwards (until they have made it coincide with the whole of modernity) that "Comtian" ideology of progress so typical of the eighteenth century, that only for a short period "between the declining nineteenth century and the beginning of the twentieth century" and purged of its many problems, of its strong ambivalences, of all its internal intricacies, became "the faith commonly held by the European intellectuals and elites]

Taylor objects that Foucault has mistaken the cause for the effect, namely the rise of a new notion of identity and of a new ethics of life as the outcome of the application of new technologies of control, when the obverse is much more likely to be true. In his view, free citizens were not unwilling to adopt some forms of self-discipline that would allow free institutions to operate. We must indeed concede that not all institutions are instruments of control and oppression and that not all powerful social agents are ill-intentioned and self-serving manipulators. Deborah Lupton likewise contests a certain type of black-and-white radical critique that deconstructs without rebuilding by describing medical professionals as tyrants and patients as victims (in Petersen & Bunton 1997: 97).

This notwithstanding, Foucault has highlighted real problems, and his approach can be used as a springboard for further analysis.

A case in point is professionalism. It is a major instrument of democratisation in that the power associated with expertise is wielded not by virtue of one's birth or social status but can, at least theoretically, be acquired through one's abilities; yet at the same time the vertical, hierarchical, sectarian character of professional organisations is the essence of elitist authority (Michael 2000) which parallels the growing bureaucratisation of society and the rationalization of social problems (Weber 1992, 2000). Where this latter spirit temporarily prevails, it is likely that a collectivist perspective will be privileged over one centred on individual expertise, and will call for an interventionist approach to policy-making that may even appeal to careerists and technocrats as well (Burleigh 1991; Dikotter 1998). A most pernicious outgrowth of this phenomenon has been evidenced by Tom W. Schick (1982) who, wondering why black physicians enthusiastically participated in the Tuskegee experiments¹⁹, found a possible motivation in the main goal of professionalisation itself, that is,

¹⁹ Those taking place in Macon County, Alabama, from 1932 to 1970, and devised to test the physical and psychological degeneration of 399 African-American men diagnosed with syphilis, which was left deliberately untreated. The tests had no scientific value.

the socialization of neophytes to embrace and safeguard the status conferred on them by the professional establishment. Black physicians felt even more committed – and special – than their white colleagues, because they had to rise above all sorts of trials and adversities in order to be accepted as professionals at all.

With respect to eugenics, it is by no means surprising that professionals who had achieved their status by undergoing a rigorous training, and a careful selection according to merit by their peers, would sympathise with a doctrine indissolubly tied to the ideal of self-enhancement and the mastery of human skills (Watts 1994).

2.1 THE ROOTS OF BIO-POWER

the Inquisitor violently enforced his creed, because it was unchangeable. The savant enforces it violently because it may change the next day.

G.K. Chesterton (1922: 78)

Well before the Enlightenment, at the time of the Greek polis, the notions of the good citizen and the biologically-fit citizen coalesced (Agamben 1998). Giorgio Agamben²⁰ has shown that in classic Greek an important distinction existed between the terms *zōē* (biological, reproductive life) and *bios* (social life), and that the former was virtually excluded from issues pertaining to the *polis* and confined to the *oikos*, in that politics was seen as the means by which biological life could be turned into *eu zēn*, namely “good life”.²¹

The relation of *eu zēn* with eugenics is self-evident. Plato himself recommended in his “Republic” that the guardians of the polis be well-bred. The ruler would assume responsibility for the well-being of his subjects, who would in turn self-govern their bodies in the interests of the common good. This is in tune with Quine’s observation (1996:132) that the *widespread notion that the state should control reproduction lay at the very foundation of population policies in both dictatorships and democracies*. To put it differently, our concern for security, health, and well-being is the fuel of those technocratic policies that are also designed to regulate our sexuality, reproduction and, last but not least, social functioning. This, I believe, is what Agamben means when he speaks of *il punto in cui la servitù volontaria dei singoli comunica col potere oggettivo* [“the point in which the voluntary servitude of individuals relates to objective power”] (Agamben 1995: 9). When I warn that techno-eugenics is not as inoffensive as some would like us to believe, I refer to the disquieting fact that various aspects of biotechnology, and of our attitudes to it, blur the line separating *zōē* from *bios* due to an excess of genetic essentialism and biological determinism.

We can and should combat any such excesses. Nowadays, citizens participate in the political life of a modern democracy as both biological and political entities that can be classified and directed quantitatively through computing, classification, and monitoring, as before they were through demography and statistical-medical recording; and their active engagement is now to be secured through biomedical technology. However, this may not necessarily be an unfavourable development, given that the same criteria of classification and professional empowerment can also serve for the benefit of all citizens, and were actually devised precisely to that end (Gelb 2000).

The birth of social medicine, or hygienism, in the middle of the 18th century is a phenomenon that cannot be separated from the engagement of the State in the field of health (public health) and population growth (population policies) (Weingart in Propping & Schott 1992). An idea of medical policy had been created, according to which the government was expected to take on the responsibility for all citizens’ health and wellbeing (Seidelman 1989). Later on, citizens would further be requested to show their commitment to the common good by keeping themselves healthy and fit: a veritable mobilization of consciences revolving around an ethics of duty (Vigarello 1993). This collective struggle against germs and

²⁰ See also Hanna Arendt’s, “Vita Activa” (1960).

²¹ As an aside, the 1679 Habeas Corpus referred to the physical body not to the social entity.

pollution became a convenient pretext for enforcing social control, namely, for carrying out the medicalisation of society (Claudine Herzlich in Auge & Herzlich 1984). On these grounds public administrators could, under extreme circumstances, withhold basic rights, and even, as was the case with eugenics and racial hygiene²², strip away people's rights to exist.

In some countries where a liberal tradition was deeply rooted in the cultural and social fabric, such as England and France, medical police did not acquire an autocratic character. Not so in Germany, where different historical developments were conducive to an authoritarian interpretation of the medical police's functions, which ultimately resulted in the relatively unhindered establishment of the Nazi biocracy. In Germany things came to a head when bio-politics gradually changed into thanato-politics. In 1920 Karl Binding, an expert in criminal law published a pamphlet on euthanasia entitled *Die Freigabe der Vernichtung lebensunwerten Lebens* [The authorization for the extermination of the life unworthy of living] in which he urged politicians to intervene once and for all to settle the matter of all those whose life is *wertlos* [worthless] and release them (*erlösen* which, ironically, also means "to redeem") from their existential burden, in so doing relieving the German taxpayers of a huge economic commitment. This is how it begins (Kaiser at al., 1992: 79):

Gibt es Menschenleben, die so stark die Eigenschaft des Rechtsgutes eingebüßt haben, dass ihre Fortdauer für die Lebensträger wie für die Gesellschaft dauernd allen wert verloren hat?

[Do human lives exist, that have so completely forfeited their prerogatives that their prolongation has permanently lost its meaning for those who have to lead them as well as for the society?]

This booklet would serve as a blueprint for the 1940 *Euthanasie-Programm für unheilbaren Kranken*, a euthanasia-scheme that would be carried out over the next 15 months and would claim between 40,000 and 60,000 lives. In the end, in the NS Reich the sovereign consorted with the bio-medical experts marking the lowest point of bio-politics, one at which *il dato biologico è, come tale, immediatamente politico e vice versa* [biological data as such are at once political data and vice versa] (Agamben, 1995: 164). The identification of the health and hygiene of every single citizen with the health and hygiene of the State is thus an important element of modern statecraft, one that the Nazi state exacerbated (Agamben 1998):

Solo perché la vita biologica coi suoi bisogni era ovunque diventata il fatto politicamente decisivo, è possibile comprendere la rapidità, altrimenti inspiegabile, con cui le democrazie parlamentari hanno potuto rovesciarsi in stati totalitari e gli stati totalitari convertirsi quasi senza soluzione di continuità in democrazie parlamentari

[Only by considering the fact that everywhere biological life with its needs had become a politically determinant element, can we understand the rapidity, otherwise inexplicable, with which in our century parliamentary democracies have been overturned by totalitarian states and totalitarian states have been converted almost seamlessly into parliamentary democracies].

Agamben 1995: 134

The extermination camp comes to epitomise the point of no return in western bio-politics, wherein the distinction between nature (*zoé*) and politics (*bios*) no longer obtains: what is a dead weight by the *zoé/bios* criterion (e.g. Jews, Gypsies, mentally and physically disabled, etc.) is to be disposed of. In view of the steady advance of reprogenetics, we should always bear in mind that the bio-sciences, by their very nature, seek to separate once and for all these two domains by making biological life (*zoé*) altogether artificial and by naturalizing social life (*bios*). Past applications of these sciences' findings to society – social Darwinism, eugenics, socio-biology, evolutionary psychology – have all developed crude yet seductive theoretical currents that were far from liberating or benevolent.

²² In Germany the debate on human enhancement resulted into a divergence between the advocates of *Eugenik* and those who supported *Rassenhygiene*. Eugenik stood for a hierarchy of value within a population, whereas racial hygienists held that there existed a hierarchy of values between races (Link 1999)

2.1.1 INQUISITORIAL BIO-POWER

Be it as it may, it is worthy of note that at least one national Church was involved in the process of formation of this ideological and institutional compound that we nowadays term bio-politics. Diego Gracia Guillén (Alcalá 1984) has convincingly argued that in early modern Spain social control was anchored to the medical treatment of environmental, constitutional and temperamental factors that is, to the governance of life. Doctors assisted the inquisitors in the execution of their duties by providing a theoretical and "scientific" justification of their practices, and this by means of three arguments:

- That Jews are intrinsically depraved and inferior;
- That their inferiority and moral depravity does not derive from external factors but from their being members of a different race;
- That their "redemption" is not attainable because those characteristics are inheritable.

The Spanish "new Christians" were created by means of a biological classification articulated into 20 categories of *métissage*, and religious orthodoxy was assimilated to *limpieza de sangre*, i.e. purity of blood (Dedieu 1992). The biologisation of faith was a trend that began in the fifteenth century, when social discrimination against all those who were not Old Christians turned into racialism (Kamen 1997). This involved maintaining that by the time of its conception the foetus had acquired its parental traits, and that the Jewish hatred for Christians was an infection that would be passed on from mother to child. In this respect, the eminent Spanish historian Julio Caro Baroja (quoted by Guillén, *ibidem*: 338) has observed that the inquisitors' mentality *estaba tan cargada de "biologismo" que hacía pensar incluso que la leche de mujer judía hacía judaizar* [was so impregnated with "biologism" that one was led to believe that the milk of Jewish women could "judize"]

Once we disassociate modernity from the Enlightenment we can see that, pace Bauman (1989), Foucault and the theorists of the Frankfurt school, the roots of Holocaust are not only to be found in French positivism, or in the iron cages of rationality, but also far earlier: such racism is partly a hangover from feudal practices such as the *noblesse de race* (or of the semen).

A cavallo tra la biologia e la morale, il concetto di purezza del sangue apparteneva già da tempo all'ideologia nobiliare: la pratica endogamica della nobiltà spagnola e tedesca si giustificava implicitamente o esplicitamente con l'assunto che le virtù nobiliari si ereditassero col sangue

[Somewhere in between biology and morals, the concept of purity of blood had been for a long time part and parcel of the aristocratic ideology: the endogamic practices of Spanish and German nobility was implicitly or explicitly accounted for through the assumption that aristocratic virtues were inherited through one's blood].

Giuliano Ghiozzi (1990: 246)

The aspiration to complete *limpieza de sangre*, "cleanness of blood" (that is to say, "purity of descent"), was exported to the New World, owing to the fact that it had become a veritable obsession when the *Reconquista* of the Iberian Peninsula had been carried through and there remained the problem of how to deal with the infidels. Furthermore, the *Conquista* of the Spanish Empire was beginning and the authorities were determined to find rational ways to administer their new subjects. The approval by Pope Alessandro VI of the *Estatuto de Limpieza de Sangre* set in motion the "apartheidisation" of Jews, Moors and the indigenous people of America, but the statutes anticipated the establishment of the Inquisition (Villanueva & Bonet 1993).

The Spanish Inquisition was given the green light in 1478 when Pope Sisto IV issued the bull *Exigit sinceræ devotionis* by which Isabel and Fernando of Castilla were entitled to appoint "honest men" who would investigate cases of spiritual infidelity and administer congruent punishments. From the beginning it appeared clear that the major difference between the old (French, papal) Inquisition and the Spanish Inquisition was the political function of the latter. As Ricardo García Cárcel has put it (1990: 13) *el factor religioso – el problema judío concretamente – no parece decisivo para el nacimiento de la*

Inquisición moderna, and indeed the Grand Inquisitor Tomás de Torquemada was a state functionary before being a member of the clergy and, paradoxically, a Jew's grandson.

The assessment of one's *limpieza de sangre* was made through a genealogical survey that made use of sworn statements by a person's acquaintances, and by several witnesses, in order to establish the number of generations through which a person could demonstrate that the lineage was free from Jewish (or Moor) blood. Converts (*marranos* and *moriscos*, or *cristianos nuevos*) were forbidden to take on public offices or to sail to the new American colonies. However many of them managed to dodge the inspections so that a good number of converts settled down in the New World, forcing the Spanish Crown to set up the colonial inquisition (25 January 1569). Although in South America the jurisdiction of the American inquisitors did not include the indigenous, by extension Native Americans fell into a similar category as the converts, as they were deemed unsuitable to mate with Spaniards.

De hecho los estatutos de limpieza crearon una casta de parias que infectaron a todos aquellos que de alguna manera se les unían, pero una casta no reconocible por características externas, por lo cual nadie podía decir qué corrupción de sangre acarreaba sobre su familia en cualquier matrimonio que pudiese contraer. [...] Podemos comprender cómo esta imborrable mancha se debió difundir por la sociedad de modo que podía aparecer en cualquier momento en los lugares más inesperados

[The statutes of cleanliness actually created a caste of pariahs who infected those who had any sort of contact with them. But this caste could not be identified by external characteristics, so that there was no way to foresee the degree of blood-corruption that a marriage would bring upon one's family.[...]. Understandably, this indelible *stain* would propagate through society so that it could unexpectedly surface in any place and at any time]

Henry C. Lea (VOL. II; 1983: 177)

Objections have been raised against this one-sided interpretation of early racism in Spain. Kamen (1997) argues that we would be misguided in believing that the entire Spain fell prey to this "epidemic" of intolerance. Very few public institutions adopted the statutes and most of them delayed the adoption and were lax on their enforcement: *the statutes were never part of the public law of Spain and never featured in any body of public law* (Kamen *ibidem*: 239). There was indeed an "impressive opposition" by the elites, that were considerably "tainted" by *converso* blood – the royal lineage included – and feared that the exposure of one of their members would bring infamy upon the whole family, and by several popes. Nevertheless, Kamen also remarks that the criterion of *limpieza* remained customary in those power struggles fought to enhance one's status by debasing the status of one's political adversaries. Thousands of families could not vindicate their honour for several generations.

Interestingly, Dedieu (*op. cit.*) observes that the inquisitors did not really believe that heterodoxy and heresy ran in the blood. They merely used this diverse and finicky taxonomy so as to reinforce and corroborate the proofs that they had already collected. Yet it was because of the inquisitors' concern about purity that Spaniards came to regard racialism as a suitable way of categorizing people and that this attitude became part and parcel of the formation of Spanish identity²³.

On balance, this mania with cleanliness was by no means a pathological aspect of Spanish society but existed in the common parlance of European nobles and laypeople alike. The identification of an aristocratic lineage with a specific racial stock was quite common in early modern France and Germany (Gliozzi 1990), and it is self-evident that the discriminatory norms operated so as to widen the gap between those who were already privileged and those who could only aspire to become such. The vast majority of the Spanish population was made up of Old Catholics, and discrimination among Catholics did not meet with their favour (Kottek & Garcia Ballester 1996) for it ran against the universal value and function

²³ Incidentally, in the former, papal model of inquisition there was a disturbing parallel to the way Nazis executed their plans of progressive segregation of Jews, which was the pre-condition for their extermination: the papal model meant that *almost all those convicted of heresy but not imprisoned had to wear yellow crosses on their clothing* (James B. Given 1997: 84)

of baptism. Anyhow, few obtained any profits from the new state of affairs whereas the nobles, who were often "*manchados*" but possessed the means to bribe the inquisitors, seldom lost their status (Villanueva & Bonet 1993).

However, against Foucault and Weber, I want to argue that modernity did not only produce an iron cage of self- and hetero-disciplining but also the means to scrutinize, question, and undermine the system. The inquisition was obscurantist, but simultaneously developed traits of modernity, such as a remarkable ability to keep an accurate and updated record of people and goods, to organize countries and communities homogeneously, and to exert a thorough social control (Given 1997), something that did not invariably encounter the hostility of the population; on the contrary, many Latin-American natives felt the necessity to modernize themselves (Platt, lecture notes; Schwartz & Salomon 1999). On the other hand, the means of social control and integration that the Inquisition devised turned out to be a most efficient way for the colonists to deal with problems of ethnic boundaries, ethnogenesis, and the fragmentation of cultural identities. Back in the motherland, *Moriscos* were by no means treated more humanely. Once again we behold the association of an ethnic minority with an infectious disease, a vermin in the social body of Christianity. Only an uprising in Flanders prevented the Spanish Crown from carrying out a plan to sink ships filled with deported *Moriscos* off the Spanish coast (Rooth 1988):

genocide was a very real possibility, and it was seriously considered by the Crown, as was castration of all male infants and the enslavement of all adult males.

Rooth (1988: 131)

This identification of moral traits with biological and physical characteristics, and the resulting discriminatory attitudes, resemble to an astonishing degree beliefs and practices of German, American, and Scandinavian racial hygienists and eugenicists (Weingart 1988; Weindling 1989; Kühl 1994, 1997). Blood as a discriminatory criterion was to become once again a popular idea between the First and the Second World War, when the Austrian immunologist Karl Landsteiner discovered blood-groups²⁴, which enabled his German colleagues to direct their attention to the variability of ABO and rhesus blood types across Europe, so that Nazi propaganda portrayed Germany as a bulwark of type A blood fighting the encirclement of people with type B blood (Mazumdar 1990; Greely in Peters 1998). Similarly, in interwar France serologists displayed a racially-minded approach to the hygienic and medical measures that had to be taken in response to the rising immigration rate (Schneider 1994).

In conclusion, what happened in Spain, as later in Nazi Germany and elsewhere, was that this phenomenon was aggravated through the employment of purportedly medical and scientific criteria, and the more systematic formulation of racial doctrines. We should remember (following Bonet's assumption in Villanueva & Bonet 1993) that the Inquisition also fulfilled the all-important functions of social control, and strengthened the elite's authority and economic power by depriving the minorities of their financial and political assets. Most telling in this regard is the statement by the Archbishop of Valencia, Juan de Ribera (1532-1611): *ay tambien en este medio una gran conveniencia que es hacerlos pobres* [what is convenient about these means is that we make them poor] (Kottek & Garcia Ballester 1996: 127). The unprecedented emphasis on biological traits, that is, on prevention, and on the disciplining and correction of the social body through indoctrination rather than methodical corporal punishment or execution, are precisely those modern traits that Foucault has mistakenly attributed to a later stage of development of Western societies (Perry & Cruz 1991); and there is no reason to suppose that something similar may not occur again in the future.

²⁴ A discovery that earned him the Nobel prize in 1930.

2.2 EUGENICS AND THE MEDICALISATION OF SOCIETY²⁵

In my opinion, it is meaningless and dangerous to encourage the illusion that health is a birthright of man, and that freedom from disease can be achieved by the use of drugs and by other medical procedures. Like political freedom, freedom from disease should not be regarded as a commodity to be distributed by science or government. [...] Health can be earned only by a disciplined way of life.

René Dubos (1961: 93-94)

Being modern means being disciplined, by the state, by each other and by ourselves; ... the soul, both one's own and that of others, became organized into the self, an object of reflection and analysis, and, above all, transformable in the service of ideals such as productivity, virtue and strength.

Robert van Krieken (quoted in Given 1997: 219)

After Foucault, "medicalisation" designates the process by which Western thought has come to conceive diversity as preventable biological unfitness. This prevention can be attained through self-discipline, expertise and record keeping. The resulting approach to the resolution of social problems, also known as the "medicalisation of deviance" (Labisch 1992) or "biological standardization" (Canguilhem 1972), is – according to Foucault – part and parcel of the *paradigm of maximization* that has been established over the past two centuries as a natural accompaniment of capitalism. This current of thought was inaugurated by the theories of the American engineer Frederick Winslow Taylor – hence the designation of "taylorism" – and gained much ground among Darwinist sympathisers, who regarded the mechanism of natural selection as a prodigious instrument to render efficient human reproduction and in so doing guarantee the perpetuation of our species (Kühl 1997):

Telle doit être la méthode de l'Eugénique; perfectionner les qualités et réduire au minimum les inconvénients des défauts. C'est, en somme, l'application à l'individu de la méthode de Taylor qui s'impose à l'organisation des sociétés humaines; c'est la méthode de la division du travail appliquée en grand dans l'industrie où elle a donné les meilleurs résultats.

French biologist and doctor Edmond Perrier (in Carole 1995: 196)

There logically follows a pecking order of citizens, from the least talented to the most adroit, from the hopeless cases to the perfectible and perfect, the former doomed to be a burden to the State budget (Foucault 1994) and therefore dispensable.

This event occurred as a consequence of a paradigmatic change that took place during the last three decades of the nineteenth century in both medicine and population policies. The focus shifted from the individual to the social (from micro to macro) and from solving to preventing (Maiocchi 1999), and eugenics was arguably the most salient result of this "new" outlook. Historically, outbursts of eugenics by and large coincided with phases of major disruption in the social fabric and with massive economic crises, such as the 1880s or the 1930s. We can thus hypothesise that historical circumstances played a crucial part in the radicalisation of these leanings.

The Marxist definition of modernity – *all that is solid melts into air, all that is holy is profaned* – best exemplifies the cultural and moral predicament of *fin-de-siècle* Europe. In the second half of the nineteenth century a wide gap formed between the great expectations of universal regeneration that had accompanied the 1848-1849 insurrectional movements, and the reality of post-1849 Europe, a continent dominated by despotic, uncompromising and reactionary leaders (Talmon 1960). By 1880, classical liberalism in Western Europe was inexorably receding across the continent. Criminality was

²⁵ According to Michel Foucault (1994b), medicalisation is the semantic and functional integration of existence, conduct, behaviour, and the human body in a medical framework. One of its corollaries is that even healthy people are inclined to feel at risk (Armstrong in Albrecht et al. 2000)

identified either with parasitology or with racial decay, and in 1888 Charles Féré would maintain in his *Dégénérescence et criminalité* that those who did not meet the standards of normality and were not only unproductive but also costly – criminals, mentally retarded, disabled – were to be considered as so much social waste and, as such, had no right to live (Pick 1989). The misplaced reliance on extreme rationalism, besides being conducive to the progressive biologisation of values (Weindling 1991) and the conflation of virtues and hygiene (Colla 2000), gave rise to the social science of population health, or “social medicine”, a discipline that assessed the strength of a country on the basis of the health of its citizens (Porter 1999). The expression *médecine sociale* made its appearance in 1848, coined by French orthopaedist Jules Guérin (1801–1886) (Canguilhem 1994).

Correspondingly, this increased the status of the medical profession, so that the task assigned to doctors became not just healing the sick but also safeguarding public health (Maiocchi 1999). On the one hand, the ascent of positivistic scientism was relentless thanks to repeated triumphs, especially in the field of bacteriology, which induced the public to turn away from the transcendent and symbolic characterization of illness typical of religious creeds (Cosmacini 1989). On the other hand, politics and empirical sciences merged, to a greater or lesser extent, depending on the cultural context. In Germany the final outcome was a *technokratische Antipolitik* (Lübbe cited by Weindling 1991). I will give a brief summary of these events:

- The stock exchange crash of 1873 brought about the so-called Great Depression which lasted until the 1890s. High mortality, morbidity, and crime rates, combined with massive labour unrest and the rising birth rates of the lower classes, had become a growing concern for national elites (MacMaster 2001). They dreaded an imagined degeneration of the human species, accompanied by the perception of a rapid decline of Western civilisation, increasingly viewed as a *krankmachende Gesellschaft*, a society conducive to sickness and self-destruction (Schott in Propping & Schott 1992), because of its inherent predisposition to exert psychologically and physiologically debilitating influences on its members (Herman 1997). Ironically, the only real decline that it witnessed was that of aristocratic hegemony (Stone 1999).
- The growth in number of the feeble-minded was manifestly due to better means of population survey and recording, as well as to the establishment of universal education that made evident the inability of numerous pupils to keep pace with their peers (McLaren 1986). But this explanation did not satisfy eugenicists, who strove to frame a scientific model alternative to the two proposed solutions to the problem of pauperism, i.e. the Marxist dictatorship of the proletariat, and the liberal-Welfarist plan of broad and expensive social protection for the underprivileged (Ambroselli 1994; Weingart, Kroll, Bayertz 1988). The ironic twist in the eugenic saga is that even self-proclaimed Marxist scientists espoused eugenics, perhaps owing to their being members of the intellectual elite (Beckwith 2002).
- But cultural and ideological blinkers prevented many intellectuals from reaching a true understanding of the causes of this malaise. The dominant frame of reference became the biologisation of pauperism: socially subordinate people were ignorant, sick, and poor because they were naturally inferior, they actually constituted a race apart (Dorothy Porter 1991). The two feelings that caused many a *fin-de-siècle* intellectual to embrace eugenics were a widespread fear of a biological threat from below (Scherer 1990) and a boundless optimism about the opportunities offered by techno-scientific advancement to carry out a planned, technocratic development oriented to the perfecting of human beings and to biological salvation (Weingart et al. 1988; Tucker 1994)²⁶. This faith in a techno-scientific deterministic response to huge social challenges is ultimately responsible for the eugenicists' fluctuation between socialist reformism and racist totalitarianism (Bernardini 1997).
- This tendency was further reinforced by the fact that sustaining eugenic arguments within a biological-organic theoretical framework was in vogue and widely accepted as a solution to the “vain idealism” of those who naively believed that social problems could be solved through purely social means (Sieferle 1989). This alleged naïveté was to be replaced by the absolutization of the doctrine of social and biological progress, whereby social issues would be analysed not in terms of what men actually are but of what they should be – and could eventually be after appropriate interventions (Talmon 1960; Dikotter 1998)²⁷. It is of some interest to note that all major utopias were anti-democratic precisely due to their being founded on an ideal configuration of mankind (Spitz 1965). Hence eugenics, with its messianic and scientific character and its refusal of the principle of human equality at birth, could not possibly be other than totalitarian.
- By the 1880s, the working classes had become a reading audience and by the 1890s Darwinism was shaping their philosophy of life (Kelly 1981). The same period witnessed a shift from liberal and progressive Darwinism – in 1869 biologist Friedrich Ratzel explained in the preface to one of his publications that he aimed to make propaganda for

²⁶ The notorious fascination with the possibility of a technological fix

²⁷ There is...one long-recognized weakness in Utopian speculation: the inadequacy of man, the extreme unlikelihood that man can live up to his own ambitions. It is for this reason that the idea of a genetic improvement of man has a special fascination for Utopian thinkers (Medawar 1990: 103).

"progressive tendencies" (Kelly 1981) – to selective, racial, and imperialist Darwinism, as well as the birth of eugenics (1883), the rise of medical interventionism (Arnold 1988), and a number of means of social controls such as passport regulations, work quotas, and the first institutions to segregate the mentally ill and mentally retarded (Reilly 2000)²⁸. Almost simultaneously the first concentration camps were built in Cuba (1896) and South Africa (1900) (Massin 1996). Nazi collectivism, epitomised by the slogan: *Du bist nichts, Dein Volk ist alles* [you are nothing, your people is everything], was only one among many developments made possible by the exigencies of social control.

- Utopian communities all across Europe²⁹ underwent a radical change, and the initial pseudo-anarchism³⁰, premised on the primacy of individual welfare and happiness, gave way to conformity with the iron laws of nature, namely, the tenet underpinning the Hitlerjugend and Lebensborn projects (Weindling 1989a)³¹. A most representative instance of this shift is the almost legendary socialist-utopian commune of Monte Verità, near Ascona (Switzerland). Founded in 1900 as an experiment in Lebensreform and a precursor of anti-psychiatric practices³², owing to the neo-pagan, völkish, anti-capitalist, and anti-individualist undercurrents of its members, it soon irradiated proto-Nazi doctrines, although always beneath a façade of respectability (Green 1986). Contemporaneously, eugenic societies were founded, and some partially experienced this neo-pagan frenzy (Conte & Essner 1995)
- Still in the 1880s, radical right and anti-Semitic doctrines infected occultism – the expression anti-Semitism was actually coined in 1879 – whose practitioners, already possessed by considerable contempt for democratic institutions, grew ever more hostile to liberalism and moderate socialism (Glatzer 1997). As a result, in 1881 the Association of German Students was founded, which consecrated itself to the fight against materialism, rationalism, liberalism, and their embodiment, the Jews, for the sake of the Volk, and in 1889 Austrian university fraternities resolved to accept Aryan students only (Mosse 1964).

Eventually, the massive repercussions of the crises of the 1870s-1880s, and later that of 1929, transformed reforming enthusiasm into a pernicious doctrine. What seemed unthinkable in times of prosperity became commonsensical in times of hardships (Paul 1995)

As I have said, this was not an inevitable outcome and it would be vain to equate eugenics and reproductives on account of their potential for abuse. We know, for instance, that in the post-1929 United States the reaction of the population to the crisis was antithetic, because those who belonged to the higher ranks of society went to the wall and their life was as miserable as that of the alleged unfit. In this context, heredity could not possibly be the culprit (Marks 1995).

Nevertheless, by and large, eugenics was thought by many intellectuals to be the ultimate, benign solution to this unprecedented cultural and moral crisis. For example, Francis Galton argued that *what nature does blindly, slowly, and ruthlessly, man may do providentially, quickly, and kindly* (Galton 1904: 5), that *the average citizen is too base for the every day work of modern civilization*, and that *eugenics cooperates with the workings of nature by securing that humanity shall be represented by the fittest races* (Galton, in Herman 1997: 133). This slippery slope was descended almost unconsciously by several unemployed bio-scientists who fell prey to the seduction of élitist doctrines prescribing a life of active engagement in the radical transformation of a sick society:

²⁸ What took place following the industrial revolution was the transition from the more or less peaceful co-existence between normal and abnormal people to the segregation of those "elements" that could perturb social harmony and industrial production (Gabbay and Webster in Oxford Review of Education, Vol. 9, Number 3, 1983. Theme: Mental Handicap and Education): *During the last years of the nineteenth century the utopian hopes of educating and essentially curing the mentally retarded had largely been abandoned. More and more, the institutions became places where the inmates were kept isolated from the rest of society, where they could be trained in certain skills according to the way they had been classified, and where a reasonable amount of work could be extracted from them, under humane conditions and for the benefit of society* (Broberg & Roll-Hansen 1996: 15).

²⁹ These social experiments were not confined to Europe. In 1886, Elisabeth Nietzsche, the person who most strove to popularize as well as distort her brother's writing, on the advice of Richard Wagner founded a colony of allegedly biologically gifted Saxons in Paraguay.

³⁰ It should be noted that in *fin-de-siècle* Spain anarchists regarded science as the only means for the achievement of true Enlightenment and the establishment of ultimate truth (Sierra 1996).

³¹ The term Lebensborn, literally meaning "fountain of life", is a Nazi neologism and comes from the medieval German term *born* ("fount", "spring", or "source") and *Leben* (life). Most unfortunately, the Lebensborn project was not consigned to history. In 1990 the NIH awarded a grant to geneticist Plomin on account of his commitment to discovering what genes affect IQ, so as to be able to pinpoint children likely to be smarter than others (Noble 1999). Incidentally, it is reported that Frederick the Great was eager to form a military elite by mating his "best" soldiers with the "best" girls (Bodmer & Cavalli-Sforza 1976).

³² See Basaglia, Foucault, R. D. Laing and Thomas Szasz.

such disgruntled academics turned to a range of socially critical ideologies, and prophetic philosophies were in vogue. They venerated cultural ideologists who raised issues beyond the confines of academic science. Cults arose around the figures of Friedrich Nietzsche, Haeckel and the Lebensphilosoph Rudolf Eucken, who were venerated as offering the basis for a critique of social conventions.

Paul Weindling (1989: 35-36)

Ernst Haeckel³³ publicly advocated racial selective breeding, the elimination of the unfit (Gasman 1971; Burleigh & Wippermann 1991), and the separation of sexuality and reproduction – a mainstay of radical and utopian eugenics (Bayertz 1994b) that may well have stemmed from some sort of puritanical sex-phobia (Baker 1990). Friedrich Nietzsche was not a genuine eugenicist, but it appears likely that he had toyed with the idea in his elucubrations on the Overman (Detwiler 1990), especially because eugenics promised to change mankind without changing society as Marxism threatened to do (Matthias Weber in Mattioli 1995; Schank 2000). There are a couple of statements that point in this direction. As to positive eugenics:

Is it not time, now that the type "herd animal" is being evolved more and more in Europe, to make the experiment of a fundamental, artificial and conscious breeding of the opposite type and its virtues? And would it not be a kind of goal, redemption, and justification of the democratic movement itself if someone arrived who could make use of it – by finally producing beside its new and sublime development of slavery ... a higher kind of dominating and Caesarian spirits who would stand upon it, maintain themselves by it, and elevate themselves through it?

As cited by Detwiler (1990: 176)

As regards negative eugenics, in "the Will to Power" (Nietzsche 1968, 734: 389) he also argued that

The Biblical prohibition "thou shalt not kill!" is a piece of naiveté compared with the seriousness of the prohibition of life to decadents: "thou shalt not procreate!" – Life itself recognizes no solidarity, no "equal rights", between the healthy and the degenerate parts of an organism: one must excise the latter – or the whole will perish. – Sympathy for decadents, equal rights for the ill-constituted – that would be the profoundest immorality, that would be antinature itself as morality!

Be that as it may, most formulations of eugenic social policy addressed the problem of the reform of "counter-selective" institutions – what we call "euthenics" – such as social welfare and national health care (Weingart 1995), regarded as factors of "selection relaxation" (Bodmer & Cavalli-Sforza 1976), as well as the uprooting of those moral codes that contrasted with the eugenic utilitarian doctrine (Marks 1995). Many a eugenicist agreed with Nietzsche that the morality of slaves and of the weak, preaching pity, compassion, and altruism, was sick, as opposed to the healthy, narcissistic and exuberant morality of the masters (Sax 2000; Stone 2002). The end result was the Nazi notion of biotic community (biocracy), in which the divide between animals and humans was effaced (zoological reductionism), whereas the divide between the healthy and the sick came to coincide with the one separating life and death (Sax 2000). Intimations of this were already evident in Arthur Schopenhauer's contention that

a real and thorough improvement of the human race might be attained not so much from without as from within, thus not so much by instruction and culture as rather upon the path of generation. [...] If we could castrate all scoundrels, and shut up all stupid geese in monasteries, and give persons of noble character a whole harem, and provide men, and indeed complete men, for all maidens of mind and understanding, a generation would soon arise which would produce a better age than that of Pericles.

Bayertz (1994b: 33)

One of the motivations behind the collaboration of science with the establishment are intelligible in Nietzsche's words, and have much to do with an undercurrent of scientific hubris in the Western cultural context:

Wir machen einen Versuch mit der Wahrheit! Vielleicht geht die Menschheit dran zu Grunde! Wohlan! [We experiment with truth! Perhaps humanity will be destroyed by it! Well, so be it!]

Nachgelassene Fragmente 1884 (1974: 84); 25 [305]

³³ We meet [in Nietzsche] an individual of the highest culture, and of a thoroughly original stamp, who experiences all the tendencies of the time, and suffers from the same unsolved contradictions by which the time itself is out of joint. Hence the echo which his language has found; hence the danger of his influence, which does not heal the sickness of his age, but increases it. Wilhelm Windelband's critique of Nietzsche (Hale 1971: 86) clearly also applies to Haeckel

Camus's portrayal of the transformation of Caligula from a young idealist into a despot due to a personal loss (Braun 1974) may well apply to Ernst Haeckel, who declared that he had become socially and politically engaged after his wife's death (Weindling 1989). The founder of a "scientific religion" that he christened Monismus (based on the natural selection of the fittest), Haeckel gradually became an élitist, intolerant preacher. He advocated the reform of society on the basis of the laws of nature (Arluke & Sax in Birke & Hubbard 1995), the elimination of "lives unworthy of life" (Burleigh 2002), and maintained that racial and intellectual inferiority went hand in hand with inferior human worth (Haeckel 1910). He also held that free will was a delusion; that liberalism was unnatural and pernicious; that *criminals will always repeat their crimes no matter how long they are held in prison* (Gasman, 1971: 97). He also publicly endorsed state-corporatism of a fascist kind (Stein 1988) and inspired Hitler who plagiarized much of the most questionable content of Haeckel's *Natürliche Schöpfungsgeschichte* and the *Welträthsel* (Gasman, op. cit.: 164).

What emerges from our discussion is that, besides the connection between professionalisation, racial prejudices and national goals, biomedical sciences have been plagued by other, more subtle and no less harmful, biases of an ideological nature.

John Vandermeer (1996) has identified genetic determinism – the belief that individual temperaments and social ills are to be imputed to organic malfunctioning –, neo-Malthusianism, and nature worship as a scientifically inspired and socially constructed trinity of beliefs that propelled Nazism. Their connection was established in *fin-de-siècle* Germany and is at the core of much eugenic rhetoric. Biological and genetic determinism has been at the core of three potentially explosive doctrines (Robert Sprinkle 1994):

- the cell-state theory (*Zellenstaat*), collapsing social complexity upon a simplified organic representation of society – state is to body as citizens are to cells (Webster 1981);
- social Darwinism, the notorious misapplication of the principle of natural selection to society;
- eugenics, a utopian and prejudiced plan to regenerate humankind through selective breeding (Sprinkle 1994; Frewer 2000).

Notably, these three doctrines translated into political schemes promoting an interventionist approach urging life scientists and physicians to perform their socially therapeutic role within the body politic, and favoured a climate of moral panic in which shrewd politicians could persuade the population that the predicament was so dramatic that it was really a matter of extreme measures (Burrow 2000). The legacy of these schools of thought in modern scientific and social theory is still potentially deleterious to democracy. On the one hand, we still entertain a belief in species hierarchies ("man" at the top), in intraspecies hierarchy (some humans are better than others), and in human perfectibility (Rotschild in Goldman 1989). On the other hand, we behold the degradation of our conception of humanness into flesh and molecules that can be intentionally manipulated (Kaas in Lygre 1979). This is characteristic of scientific reductionism, for science – unlike ethics – necessarily deals with shreds of experience and not with the whole of human existence (Butler 1976)³⁴. Indeed, we may postulate that a tendency to see success in terms of genetic continuity, and to regard nature, not man, as the arbiter of thought, is probably inherent in the biological profession's idea of itself (Ravin 1978).

Nazism actually issued from the intersection of these doctrines with anti-Semitism (Conte & Essner 1995). Obviously, the appalling economic circumstances played a cardinal role in coupling self-interest, nihilism and Social Darwinism – a current of thought that principally appealed to doctors and biologists (Vogt 1997) – and turning them into a

³⁴ *Confronted by the data of experience, men of science begin by leaving out of account all those aspects of the facts which do not lend themselves to measurement and to explanation in terms of antecedent causes rather than of purpose, intention and values. [...] Science does not even profess to deal with experience as a whole, but only with certain aspects of it in certain contexts* (Aldous Huxley, "Science, Liberty, and Peace" 1946, in Dubos 1962: 564).

successful ideology (Reichlin 2002). The two common underlying principles, namely an organic conception of the State and the belief that *Gemeinnutz geht vor Eigennutz* [public interest comes before self-interest] were combined in a treatise eloquently entitled *Das Recht auf Gesundheit und die Pflicht sie zu erhalten* [the right to health and the duty to preserve it] published in 1921 by the deeply religious Swiss physiologist and biochemist Emil Abderhalden (Frewer 2000). The foundations had thus been laid for the Nazi doctrine described by the slogans *Gesundheit ist Pflicht, Krankheit ist Pflichtvergessenheit* [health is a duty, illness is the neglect of this duty] (Kudlien in KIZ 1988) and *im Mittelpunkt der nationalsozialistischen Auffassung steht die Pflicht, gesund zu sein* [central to the National Socialist creed is the duty to be healthy] (Klee 2001: 46); but also for statements of the kind made by Swedish physician Hugo Toll, who in 1913 held that being weak and sick was *a great shame* (Colla 2000: 103). Notably, the Swedish language has a term, *skötsam*, which designates someone who has internalised those norms of hygiene and personal care that make for apt citizens and industrious workers. After all, at a time in which nationalists and socialists held such a sway over public opinion, it is unsurprising that the old dream of achieving human perfection and therefore generalised happiness would be re-interpreted in collectivist terms (Lilienthal 1979).

In truth, the study of the NS ideology and of the eugenic movement reveals that the issue is not really whether the modern, Western worldview is more harmful or advantageous to the good of humankind, but rather how this proclivity to find all answers in the natural sciences – or more precisely in the *aristokratischer Grundgedanke der Natur* and the *freies Spiel der Kräfte* as Hitler wrote in his “Mein Kampf” (Vogt 1997: 282) – could have triumphed in an ostensibly cultured and pluralist society such as Germany.

These metaphors and tenets, and the accompanying radicalism, were well known to those bacteriologists and social hygienists who sought to arrest epidemics of typhus and cholera in Wilhelmine Germany. Paul Weindling (in Ernst & Harris 1999; Weindling 2000) and Christoph Gradmann (2000) report that between 1890 and 1920, imperialism and racism combined with bacteriology so that Jews, Gypsies and Romanies became identified as germ- and disease-carriers after the establishment of the association between racial attributes and susceptibility to given pathogens.

Interestingly enough, Jews had formerly been associated with plague and leprosy by Christianity (Ginzburg 1991), and the *philosophes* had portrayed their attack on Christianity as a medical campaign against a disease, for Christianity was *an infection, a malignant foreign body, a “sacred contagion”, a “sick man’s dream”, a germ sometimes dormant but always dangerous, the source for epidemics of fanaticism and persecution. In the rhetoric of the enlightenment, the conquest of nature and the conquest of revealed religion were one: a struggle for health. If the philosophes were missionaries they were medical missionaries*

Gay in Barber & Brumfitt (1967: 379)

Much in the same way bacteriologists and phrenologists were regarded as “guardians of civilisations” engaged in a “civilising mission”. Correspondingly, an insightful relationship has been established by David Bodanis between Pasteur’s extreme right-wing politics and his scientific pursuit (Carey 1992: 25):

Horrified by democracy, and obsessed by the notion of swarming invisible multitudes infecting and destroying civilized society, he inaugurated the immensely influential cultural concept of bacteria, which he described in terms analogous to those used to characterize the seething, unclean masses. Once this scientific model had been offered, it could easily be reversed, so that instead of bacteria resembling the masses, the masses resembled bacteria.

By the same token, it was the prestige of bacteriology that spurred Alfred Ploetz to seek out and eliminate the germs of deviance (Weindling 2000), which sounds familiar these days when criminality is sometimes ascribed to “bad genes”.

In Wilhelmine Germany, hygienists agreed to present the strictest regulations on immigration as inevitable and advantageous. So much so that immigrants from Eastern Europe were transferred in segregated carriages, or sealed trains, to places where they would be inspected, washed and disinfected, together with their personal belongings and felt *transmuted into dumb animals, helpless and unresisting* (Paul Weindling, *ibidem*: 222). Concomitantly, the political language borrowed terms from

the vocabulary of bacteriologists so as to sustain paranoid worldviews instrumental to the enforcement of tough-minded legislation (Gradmann 2000).

The whole process could be described as a vicious circle in which scientists and journalists acted more or less consciously as scaremongers, probably in order to obtain funding, visibility, and to further their own agendas, while the population pressed the politicians to intervene, and politicians more or less gladly "officialised" the emergency by legislating on the matter. The question we should ask ourselves is whether the separation between curing and killing, assistance and elimination could become hazy again (Weindling 2000).

23 EUGENICS, PROGRESS, AND THE WELFARE STATE

It is doubtful whether democracy can long continue in any society except one so set up that the more competent people in every social and occupational group are favored for survival.

Frederick Osborn (1951: 324-325)

Eugenics was an expression of a radically meritocratic outlook...It is not quite that the virtue of the bourgeois was in his body – it was centralized in his germ plasm.

Martin (1996: 123)

Eugenics, a term coined in 1883 after the Greek *eugenes*, meaning "wellborn" by Francis Galton (Galton 1883), Charles Darwin's cousin, stands for the science studying the most favourable conditions for the reproduction and enhancement of the human species. It is the "rational management of human reproduction", the last stage of the process of rationalization of everyday life envisaged by Max Weber. It is of some interest that for more than twenty years a concept that is essential for our understanding of the history of the bio-sciences passed virtually unnoticed. It was only in the 1910s that eugenics became a commonplace in scientific journals and popular magazines (Barker 1983). Throughout its history, eugenics remained a heterogeneous movement; but four propositions were commonly shared:

1. human characteristics are heritable and the mechanism of transmission can be discovered;
2. desirable and undesirable characteristics can be identified;
3. the fertility of those with desirable characteristics should be favoured, whereas the fertility of the unfit should be curbed;
4. the measures contemplated to achieve such aims were basically the following ones: marriage regulation, birth control, pedigree charts, sterilisation, castration, and segregation.

No single, univocal interpretation of eugenics can be satisfactory as countless national variations existed (Klausen 1997: 30). Nevertheless these variations can be condensed into prominent strands of eugenics. Negative eugenics was concerned with the elimination of diseases and malformations and involved sterilisation, selective immigration restriction, birth-control and, in the most extreme cases, elimination. Positive eugenics encouraged the reproduction of desirable characteristics and comprised social and family policies, prenuptial certificates, the promotion of an increasing birth-rate and of social hygiene³⁵ (Ambroselli 1994). MacMaster (2001) has argued that negative eugenics was negative on a semantic as well as on an ethical plane. It was racist, authoritarian and conservative, as its advocates were driven by a paranoid fear of

³⁵ *Euthenics or hygiene... is concerned with the manifest qualities of the organism. Euthenics is also called "positive eugenics", which tends to improve the race through the individual, who is in turn improved by a perfect social environment. Positive eugenics is differentiated substantially from negative eugenics, which tends to improve the race by impeding the continuation of hereditary defects across generations, and by eliminating the weak, the defective, the sick, the degenerate, etc. It relies on repressive methods, such as sterilization and the obligatory premarital certificate (Poggi as quoted by Horn 1994: 62). French euthenics was notably called callipédie, namely the art de procréer de beaux enfants (Léonard 1992). It is important to remember that social hygiene was NOT free from eugenic and racially hygienic concerns (Hoehndorf & Maguly-Seltenreich 1990)*

decline and regression. Positive eugenics was instead progressive, liberal, and humanist and was premised on an optimistic view of a future utopia brought about by ameliorative policies (Rostand [1953] 1987, footnote 11: p. 99).

This is perhaps true, but both types of eugenics could be either coercive or voluntary, and displayed an inclination to privilege the welfare of the species over that of the individual, a tendency that in human societies appear inevitably to lead to discrimination and intolerance. Both seem to have disregarded the whole body of biological and social studies that showed how the nature of a complex system cannot be reduced to the sum of its basic components (reductionism). Biological reductionism is particularly simplistic in that it neglects the interplay, both of the social and natural environment with a person's genetic make-up (genotype and phenotype), and of genes with molecules. This patent reductionism oversimplified the nature of social problems imputing their cause to genetic dysfunctions. But the same surely applies to environmental determinism of a neo-Lamarckian kind, that was eagerly embraced by the champions of positive eugenics. Lamarck's revival was of an ideological nature and closely tied to the optimistic view of progress as a healer of "social wounds" (Persell 1999), a trend that is far from uncommon these days among scientists and futurists:

Countless odd contemporary thought-movements, ranging from Creationism to strange, neo-Lamarckian prophecies of a future scientific progress to disincarnated immortality and omnipotence, show how hard many of us still find it to accommodate ourselves to being part of the natural world.

Mary Midgley (in Fulford et al. 1994: 16)

The eugenic movement was never indissolubly associated with authoritarian regimes, but also thrived in libertarian and democratic societies (Widmann 2001). Mark B. Adams (1990: pp. 217-220) has pointed out that other common fallacious beliefs about eugenics include:

1. Eugenics is a single, coherent, principally Anglo-American movement with a specific set of common goals and beliefs;
2. It is intrinsically bound up with Mendelian genetics;
3. It is essentially a pseudo-science;
4. It is essentially right-wing or reactionary.

The first element that strikes us is the broad diffusion of eugenic lobbyism in the world, from Canada to Sweden, from Brazil to USSR³⁶. But what Adams fails to acknowledge is that only a few countries brought that lobbyism into effect (see below). Furthermore, Drouard (1999) notes that the absence of such lobbyism did not stop Denmark from becoming the first major European country to promulgate a sterilization law in 1929 that caused the sterilization of nearly 11,000 Danes before its repeal in the 1960s. Here and elsewhere eugenics was meant to aid the State to effect those cutbacks on public spending that would make room for a more efficient Welfare State, so that eugenics lobbyism was simply superfluous.

By contrast, progressive thinkers in France, Italy and Latin America opted for a neo-Lamarckian approach – as opposed to the Mendelianism that prevailed in the above mentioned countries – involving the emphasis on environmental conditioning, and downplayed the necessity for negative eugenics, that is actions taken to prevent the insurgence of undesirable traits³⁷.

³⁶ In both Germany and England, eugenic societies were formed already by the beginning of the century: the Racial Hygiene Society in Berlin by 1905, and the English Eugenics Education Society in London by 1907 (Buchanan, 2000: 31).

³⁷ In 1866 Gregor Mendel (1822-1884) published in the rather obscure "Transactions of the Brunn Natural Science Society" a paper entitled "Experiments with Plant Hybrids", which supported a theory of dominant and recessive genetic inheritance. The rediscovery of the Mendelian laws only took place at the beginning of the 20th century, and radically changed the way eugenics was envisaged by reducing the importance of environmental factors. August F. L. Weismann (1834-1914) published his seminal treatise *Die Kontinuität des Keimplasmas als Grundlage einer Theorie der Vererbung* in 1885, in which he argued that soma is only the carrier of germ-plasm through the ages, and that there is no interaction between the two. That

Dans un pays civilisé, on ne peut songer à supprimer les individus atteints de défauts héréditaires, ni à leur interdire de se reproduire. Nous devons seulement essayer de remédier aux imperfections de leurs enfants dès leur plus jeune âge

Edmonde Perrier, zoologist and president of the French Société Eugénique (cited by Roger in Benichou 1989: 129)

This approach is also called "social hygiene" and was not exempt from eugenic and racial-hygienic preoccupations (Hohendorf & Maguli-Seltenreich 1990). Particularly instructive in this sense is Japan, where an inferiority complex with respect to the West drove leading scientists to embrace neo-Lamarckian eugenics, which held out promises that the genetic makeup of the Japanese population could be enhanced relatively quickly (Homei 2000). The racist undertones of such a project were obvious.

A further misconception is the identification of eugenicists and academic racism. On the contrary, even scientists such as Fritz Lenz, Wilhelm Schallmayer and Alfred Ploetz, who were largely implicated in the public debates that opened the door to Nazi eugenics, were very mildly racist and by no means rabidly anti-Semitic. Sheila Faith Weiss (in Adams 1990: 48) holds that *none of the eugenicists were involved in any piece of anti-Semitic legislation*. Nevertheless, the exchange of letters between Fritz Lenz and Otnar von Verschuer reveals anti-Semitic allusions, although neither ever expressed anti-Semitic feelings in public. Knigge-Tesche Renate (1999) calls this *Antisemitismus der "besseren Kreise"*.

Yet, by and large, it would be hard to draw a clear-cut line separating positive and negative eugenics when it comes to figuring out measures aimed at forestalling the risk of biological degeneration (Weingart et al. 1988).

In regard to the belief that eugenics would differ from forthcoming genetic interventions, because the former was designed as a centralised, state-managed enterprise, there could be nothing further from the truth: *a definition that requires coercion leads to seemingly absurd conclusions: that Frederick Osborn was not an eugenicist, or Havelock Ellis, or H.J. Muller, or even Francis Galton* (Paul: 133).

Finally it was not invariably fallacious from a scientific viewpoint. Some eugenicists were at the cutting edge of science in their time (Kühl 1997). Despite the numerous exceptions, by and large eugenicists' scholarship was not shoddy as compared to their colleagues' although they inferred a number of conjectures from insufficient data (Dikotter 1998); but this has rarely been uncommon among scientists.

It is relatively simple to tell the difference between science and pseudo-science retrospectively. At any present time, however, we cannot feel confident that we know whether contemporary science is fatally flawed, but we do know that most hypotheses are based on the current level of understanding of facts, and that it would be seriously misguided in the future to judge our science as "pseudo-science" in the light of what is yet to be discovered (Stein 1988). On the other hand, labelling eugenics as pseudo-science serves to advance the cause of those who have in mind its revival but are afraid of being stigmatised. Consistent with that goal they contend that the divide between past eugenics and modern genetic engineering is so wide that drawing a cautionary parallel would be unfair, if not harmful, to science conceived of as a free enterprise that should not be trammelled by "mere" ethical considerations.

Once again, how do we account for the fact that most leading geneticists of the past century were eugenicists? Were they all crooks or incompetents? Contrary to the opinion held by biologist Elof Axel Carlson (Neumann 1978), the evidence points to the active participation of geneticists and other professionals with a strong training in genetics in the international eugenics movement (Smith 1975; Harwood 1993; Kühl 1994, 1997; Pichot 1999; Weindling in Burley & Harris 2002). Kingsland (1988) correctly stresses that, besides being a reform movement, eugenics was also a springboard to a great deal of research on human heredity. In the main, ambition and political motivation spurred scientists to become involved in issues not strictly related to their laboratory or clinical research (Klausen 1997).

such an overtly deterministic theory could become so popular, although its author could not experimentally prove the existence of germ-plasm, bears witness to the crucial role played by external factors in science.

All in all it appears as though there exists a striking analogy in the fate of phrenology, eugenics, and racial hygiene, namely an inevitable tendency on the part of newly established disciplines in the field of bio-medicine and bio-sciences to pursue two main ends: the betterment of society and, simultaneously, the consolidation of the social place of the bio-scientists³⁸. Bio-medical professionals saw that equality was getting farther and farther away from mankind's reach and resolved that, alongside the fight against the presumed degradation of the human race, the time had come to act so as to make people brighter, prettier and healthier. In so doing, some more or less intentionally sacrificed the values of freedom, self-determination and human dignity for the sake of their ideological pursuit (Becker 1990). There is no disputing, then, that eugenicists' convictions were certainly potentially dangerous from the point of view of their possible political implementation. When policies were enacted in conformity to eugenic guidelines they frequently led to the violation of basic human rights.

On this score, Canada and several North European countries are no stranger to illiberal social policies of population control. Following a 1934 eugenics law, Sweden sterilized 60,000 people between 1935 and 1976. Similar laws were passed in Canada (Alberta Sexual Sterilization Act, 1928-1972: 2,845; followed by B.C. in 1933³⁹), Norway (1934: 40,000), Finland (1935-1970: 58,000), Denmark (1935-1960: 11,000), Estonia and Iceland (1938) (Kühl 1997; Colla 2000; Childs 2001). In Vichy France 40,000 mentally ill were starved to death (Ambroselli 1994). In the USA between 60,000 and 100,000 citizens were sterilized. Only Germany proceeded further along this despicable path by murdering 70,000 mentally retarded and sterilizing between 300,000 and 400,000 citizens, by virtue of the GzVeN (*Gesetz zur Verhütung erbkranken Nachwuchses*) that became effective in 1934 and was repealed in 1945 (Horban 1999; Link 1999).

Let us now take a closer look at why science and democracy can be at variance.

Mark B. Adams (1994) has noticed that the study of genetic variation from an evolutionary perspective has often proven to be hostile to democratic ideals, for it rationally questioned the notion of equality, namely the mainstay of democracy. He claims that, at the turn of the nineteenth century, bio-scientists commonly held that genetic diversity privileged aristocracy rather than democracy, which in their eyes meant entrusting the incompetent masses with a huge decisional power. Consequently, it is not surprising that in 1929 the American geneticist and eugenicist East in "Heredity and Human Affairs" maintained that it would be opportune for the sake of democracy to weight the votes of those voters who met certain competence requirements (Adams 1994).

As I will show, only in a few cases did bio-scientists directly promote radical solutions to the social question, but their public stances certainly influenced policy-makers and lay-people alike and were not held independently from deeply ingrained political and racial prejudices. Correspondingly, Bowler (1989) notes that the rise of hereditarian theories has always possessed an ideological dimension. By directing attention to hereditarianism, and favouring nature over nurture, geneticists were wholly conscious that that could imply they could pull strings on issues of human reproduction and population control. We can thus say that eugenics, as a form of applied biology, was less a scientific school of thought than a social and political movement sustained by scientists that, more often than not, justified and reinforced the status quo by peddling the false belief that weakness, poverty, ignorance, violence, and amorality were inheritable.

³⁸ Peter Skrabanek's (Skrabanek 1992) deprecation of the tendency of epidemiologists, in the absence of epidemics, to turn into sophisticated scaremongers, has been recently (first half of 2003) confirmed by the irresponsible behaviour of several epidemiologists throwing into panic the international public opinion as regards a fancied SARS world pandemics.

³⁹ It is an admitted fact in every civilized country of the world today that the unfit are multiplying at a rate something like double that of the fit. Thus, for every child born with mental, physical and moral ability to maintain and promote civilization, two are born with the instincts to flout the essential discipline of civilization and tear civilization down. (Vancouver Sun, November 1927 editorial). Be it noted that the *Sexual Sterilization Act* has been in effect in British Columbia from 1933 to 1973.

These opinions easily merged with another factor, the sense that the complexification of social and economic relationships was intractable for average-minded individuals and that a radical reform of administrative structure and practices was mandatory.

Beginning from the 19th century the welfare state had been designed as a compensation for the hardships and the risks congenital to industrial capitalism. Thereby the State-apparatus acquired a vast range of functions and duties broadening its influence over its citizens and its role as the guarantor of their happiness and well-being. In order to achieve this all-important goal the modernisation of administrative structures would undergo a radical transformation hinging on the rationalisation of all aspects of life, namely, on that combination of bureaucratisation, scientisation, and professionalisation that would inevitably correlate health, proficiency, strength, and biological enhancement to national competitiveness, efficiency, and productivity. Particularly in Germany, where the call for absolute efficiency reached prodigious heights, children and adolescents were expected to be reared by state institutions whenever their natural parents should not be able to raise their child as an *ordentlichen Menschen...der der Gesellschaft nützlich ist, der nicht sozial schädlich ist* [an orderly, socially useful person and not as a socially harmful individual]⁴⁰. In other words, control of life has become coextensive with civilization. Ironically, the inexorable law of unintended consequences had perverted what was hoped to be a third, progressive, way between communism and liberal democracy (Vossen 2001). What followed was a veritable logical and ethical slippery slope in which the suggestion was made that public administrators could and should withhold basic rights, included the right to exist – the so-called state of exception –, whenever a national or international emergency subsisted (Labisch 1992). Eugenists found it only too easy to present immigration and the ills of an iniquitous industrial society as such a kind of emergency, calling for the undertaking of radical measures of correction lest degeneration of mankind should become irreversible.

This accounts for the ideological proximity of eugenics and progressivism in the United States between the end of the nineteenth century and the beginning of the twentieth (Allen 1989). The connection that in hindsight seems only natural between science's naturalism, progressivism, and eugenics has been illuminated by the American historian Garland Allen (Garland 1976), who has pointed out that the scientific inquiry into those characters determining human behaviour encouraged a progressive and eugenic political agenda which emphasised the necessity to rebuild society according to rational criteria.

In Germany, professional and bureaucratic pressures finally led to the fashioning of an ideology that was to linger in Western thought, and that hinged on two fundamental notions (Hong 1998):

- the *risikofreie Mensch*, i.e. the risk-free citizen;
- the priority of *Vorsorge* over *Fürsorge*, i.e. prevention over health-care;

This Welfarist-pragmatic-utilitarian ideology found a most telling expression in the words of Hans Muthesius, who in 1930 was asked to celebrate the achievements of Weimar's welfare state⁴¹:

The most immense attempt at rationalization...we have conceived of the plan to exclude chance from human life and attempt in advance to consciously guide the life of both the individual and society. A grandiose attempt, when we see the progress of culture – at least in theory and when observed from a certain distance – in the repression and exclusion of chance.

Kevin Repp (2000) has called this approach to broad social issues “disciplined rationality” and imputes the comparatively rapid nazification of Germany to its widespread success among conservative as well as progressive and feminist thinkers. Weimar democracy fell slightly short of resembling what Jacob Talmon has termed a totalitarian democracy (Talmon 1960), one in which the values of liberal individualism, entailing both low social constraint and low

⁴⁰ Johannes Peteresen, *Die öffentliche Fürsorge für die sittlich gefährdete und gewerbliche tätige Jugend* (Leipzig 1907), as cited in *Folgen der Ausgrenzung. Studien zur Geschichte der NS-Psychiatrie in der Rheinprovinz*, Landschaftsverband Rheinland (1995)

⁴¹ Hong 1998: 203

group identification (Ryan 1997), must be sacrificed to a perfectionist attitude and to the methodical abstraction of its citizens (Weber 2000).

In Germany, as elsewhere, this project of perfecting society came down to the meanest utilitarian considerations. The health care system and social welfare established to sustain the weaker ranks of society during the transition from an eminently agrarian to a massively industrial system were regarded as flawed because they helped more the unfit than the fit, that is, the tax-payer. A corporative, authoritarian, and "thrifty" administration of the national economy was regarded as the only way to obviate the impending collapse of the social structure (Weindling in Lee 1990)

In the words of Paul Weindling (1987), both eugenics and racial hygiene run against liberal humanism and the Catholic value of solidarity in that they are:

- the products of technocracy, professionalism, and scientism, which are part of a worldview in which social problems must be rationally managed and science provides the ground for the objective assessment of social and political conflicts (utopian optimism)
- the product of Lebensreform and social Darwinism which predicate that social problems derive from a flawed conduct of life and from the counterselective effects of civilization and the welfare state (Arcadian pessimism).

This was also true in a pre-eminently catholic country such as Brazil, where the scientific establishment was inclined to neo-Lamarckism. In the twenties, Hélió Gomes, professor of law and medicine, in his book *Noções de higiene* enumerated the damages caused by illness:

- proliferation of sickness: hygienic damage;
- reduction of work fitness: economic damage;
- increased expenses for prophylaxis and treatment: financial damage;
- increased mortality and morbidity: demographic damage;
- decrease of the biological fitness of the sick: eugenic damage;
- atrophy of civic conscience: social damage;
- sadness, annoyance, pessimism, fatalism: moral damage;

The bottom line was that every individual disease impacts on the whole of society, that a total commitment to health was mandatory on the part of everyone, and that sick persons were a threat to the orderly functioning of the community (Beltrão-Marques 1994).

What is truly striking is how widespread the conviction became that a healthy welfare state could not provide for all and its benefits were necessarily to be confined to those who could at least partially contribute to its preservation (Usborne 1992). In 1914 Prof. Ignaz Knaup had delivered a speech in Munich whose title *Was kosten die minderwertigen Elemente dem Staat und der Gesellschaft?* [How much do inferior elements cost to the State and to society?] disturbingly sounds like Nazi propaganda slogans (from Kaiser, Nowak, Schwartz 1992).

Eventually, by the middle of the twenties the right wing of the racial hygiene movement allied itself with the Nazis (Proctor in Frewer & Eickoff 2000), who held equally drastic views on how to keep a curb on state expenditures. Clemens Cording (2000) sadly remarks that as regards German psychiatry, most doctors, nurses, and administrators not only did not resist eugenic propaganda, but failed to apply that modicum of common sense and moral scrutiny that alone would enable one to see through the Nazi deception. This phenomenon is most troubling in that it appears as though the entire German society was not prepared to stand up against the most overt attempt at replacing Christian ethics with a post-Christian, neo-pagan, illiberal doctrine (Burleigh 2002).

But then again Weimar thinkers were influenced in their utilitarian concerns by an American, namely Dr. Louis I. Dublin (1882-1969), head of several prominent public institutions such as the American Statistical Association and the American Public Health Association, as well as a staunch advocate of the Welfare State and the author of *The economic value of*

human life (1931) (Kaiser, Nowak, Schwartz 1992). Apparently the only solution envisaged was a radical intervention to improve the biological make-up of the population, in order to stave off the duty to care for the weak and the sick.

Der ideale Zustand ist der, daß die Wohlfahrtspflege in Zukunft unnötig wird und dass wir allein die Aufgaben auf dem Gebiete der Gesundheitsführung lösen

[The ideal condition is that in which the welfare care is unnecessary for the future and we only have to concern ourselves with health-care]

Eirch Hilgenfeldt, *Reichswalter* of the NS welfare system in 1933, as cited by Ayaß (1998: XI).

Only healthy German citizens were valuable citizens, because by means of ailing parts one cannot obtain a healthy German "social body". Most of all, given that it sought to aid the biologically and economically underprivileged, the welfare State was deemed responsible for the degeneration of mankind. Rolf Peter Sieferle (1989) has summarised one of the dominant views among social Darwinists and eugenicists alike:

Jede Milderung des Selektionsdrucks durch Hygiene, bessere Ernährung und steigenden Wohlstand führt dazu, daß Individuen überleben und sich erfolgreich fortpflanzen, denen dies unter einem höheren Selektionsdruck nicht möglich gewesen wäre.

[Every mitigation of selective patterns by way of hygiene, improved diet and increasing affluence, would result in the survival and successful reproduction of individuals who wouldn't stand a chance in a more selective system]

3. SCIENCE, RACE AND CLASS

Most of the leading eugenicists of whom Professor Selden writes were the product of our best schools and universities. What happened during their education? Why did they turn out lacking in humanity, compassionless, racist, and in the genetics of their day, impoverished? By the measure of the biological sciences of their time they were ill equipped to evaluate the qualities of others or make recommendations for their control. Indeed, sitting in their citadels of infallibility, in the name of humanity and science they urged on government and the professions the passage of laws of most inhumane and scientifically unsound kind.

Ashley Montagu (forward to Steven Selden's "Inheriting Shame. The story of eugenics and racism in America", 1999)

It is the solemn duty of Government to investigate the germ-plasm of its citizens

A.M. Moll⁴²

The great mountaineer, Whymper, was not a scientist. He devoted some pages of a perfectly serious book to the cretins and sufferers from goitre in the valleys of the Alps. He was horrified by these people in a way which would be impossible to a scientist, who would regard the diseases impersonally and look for the cause. Whymper allowed his horror to grow to hatred, and wished to think that the sufferers or their parents were themselves to blame. He wanted those suffering from goitre to be conscribed into monstrous armies, to be commanded by idiot cretins... That people should think in this way appals the scientists

John R. Baker (1942: 2)

The preceding chapters dealt with some of the factors thwarting the establishment of a truly humanitarian science. This chapter is about two of the most obvious biases in scientific research: race and class. I intentionally avoided the problem of gender discrimination because it did not fall within the scope of my inquiry but many colleagues have published extensively on the subject⁴³.

A cultural and ethical movement, the Enlightenment, that was originally deeply rooted in the Cartesian and Leibnizian principle of universality of reason as the distinguishing feature of humanity, developed over time empirical currents that stressed the importance of the physiological constraints to rationality, soon to become a biological, "scientific" explanation of social and cultural inequalities (Gliozzi 1990). This cognitive and ideological shift brought with it the triumph of a hierarchical conception of racial differentiation based on naturalistic premises, of which Voltaire was one of the most famous advocates. The *scala naturae*, or great chain of being, was arranged according to a rank-order hierarchical scale in which the groups and species placed on the higher up rungs were qualitatively superior and those on the lower down rungs were inherently inferior. Its original theoretical formulation must be traced back to the Greek speculations about the most suitable organization of the polis, that is a pecking order arranged according to natural laws – as suggested by Plato – and a structure in which those who were slaves by nature were bound to occupy the lowest rung – as postulated by Aristotle. But once coupled with a teleological reading of the notion of evolution, this conception became advantageous to the pursuing of colonial and imperial politics and laid the foundations for the racially biased anthropometry and craniometry.

Dominated by a drive towards the universalization of knowledge and the ordering of nature, the eighteenth century has been defined as the "great age of classification" (Schiebinger 1990). Afterwards, the divide between taxonomic and value-laden classificatory hierarchisations continued to remain blurred (Allen 1983), until the ultimate conceptualisation of scientific racism – biological determinism, for racism is nothing but biologism, namely the reduction of the cultural to the biological (Delacampagne in Goldberg 1990)⁴⁴ – was crafted by French anatomist Georges Cuvier in 1800, according to

⁴² The problem of the mentally-defective Child, South African Medical Record, 13, 22, (November 1915), p. 341 as quoted by Klausen (1997: 27)

⁴³ Among others, Asch, Franklin, Klein, Lippman, Nelkin, Rapp, Rothman, Strathern, Wertz.

⁴⁴ The term biologism was coined by German philosopher Heinrich Rickert at the beginning of the Twentieth century (Mann in Blecker 1993)

whom physical nature determined culture, and Scottish anatomist Robert Knox in 1850, who stated that *race or hereditary descent is everything, it stamps the man* (Hudson 1996: 248). The intellectual journey that led to such a fateful conclusion is exceptionally significant as regards the comprehension of the true significance of the Human Genome Project and the forthcoming liberal techno-eugenics.

First of all we know that Roman legislators made a point of superimposing the domain of rights over that of natural laws. Blood-ties were not bound up with a racist ideology. The term *gens* connoted all members of a common ancestry (stock) and therefore approximated the meaning of race, but until the end of the Middle Age conventional wisdom suggested that there were as many *gentes* as communities. The idea of grouping all *gentes* together in a number of categories according to some kind of overarching criterion was altogether alien to the European culture of that time (Hudson 1996). The concept of race only surfaced in the European culture from the fifteenth century onwards, when the medieval concern for rational categorisation foreshadowed later racial taxonomies (Baud 2001). Before then both Muslims and Christians were racists and slavers without having formulated a structured concept of race (Sweet 1997) and earlier on European explorers were still impressed by the ritual and administrative complexities of certain African and American kingdoms and judged a society depending on its socio-cultural sophistication rather than on the phenotypical characters or the quality of blood of the local populations (Hudson 1996). During the eighteenth century a generalising trend eventually prevailed that drove several prominent naturalists such as Linneus, Buffon, and Blumenbach⁴⁵ to lump together different populations according to their geographic location. The colour of the skin would then correspond to the continents inhabited by these populations. The number of races thus was reduced to around five, and the white European race was deemed the finest one (Hudson 1996). Subsequently, the growing pressure of the affluent mercantile class and of the imperialist bent of many sovereigns called for the negation of the Leibnizean tenet – almost proto-Lamarckian – that somatic and cultural diversity was due to different environmental conditions, for this repudiation would bring with it the right to deprive the non-white people of their lands, resources and, ultimately, of their freedom (Gliozzi 1977). After that and until the end of the Nazi folly, *reason has been used more often to justify racism than to combat it* (Delacampagne in Goldberg 1990: 86). At the same time the collapse of another cardinal humanist and anthropocentric dogma took place, one framed by Descartes and Leibnitz, which stated that what distinguishes humans from the rest of the Creation is their rationality. For Locke, a physician and a philosopher, other attributes were at least as important as reason to configure humanness, and the great Swedish naturalist Carl Linné (Linneus) through his systematic classification simply incorporated humans into nature.

The neutrality and objectifying distanciation of the rational scientist created the theoretical space for a view to develop of subjectless bodies. Once objectified, these bodies could be analysed, categorized, classified, and ordered with the cold gaze of scientific distance

Goldberg (1993: 50)

Racism actually emerged in the seventeenth century as a consequence of modernity's dismissal of religious means of classification of identity and personhood (Goldberg in Essed & Goldberg 2002). When Europeans began construing their "imagined communities", empiricism, utilitarianism, and rationalism called for the systematic tabulation of perceived differences in behaviour and exteriority and suggested that they were innate. David Hume, in a footnote to the 1753 version of his treatise "Of National Character", wrote that Negroes were naturally inferior to whites (Hudson 1996) and by the middle of the nineteenth century race and nationalism were finally coupled. Thus the subjugation of non-European people and the exploitation of the lower classes became "legitimate" if not "advisable" and "humanitarian" (Goldberg in Essed & Goldberg 2002). It is well known, for example, that for Florence Nightingale the introduction of health care to India was

⁴⁵ Johann Friedrich Blumenbach (1752-1840) was not a racist, though. On the contrary, he believed Negroes were not inherently stupid and had collected a library of books authored by Negroes (Graves 2001)

tantamount to a renewal of the subcontinent and that David Livingstone did not set apart medicine and the preaching of the gospels (Arnold 1988).

Paradoxically, as the major European thinkers strove after the popularisation of egalitarianism, racism, slavery and the doctrine of white supremacy were rampant (Young 1996). One possible explanation (Rossi 1995) is that equality, fraternity, and freedom were then meant to be the exclusive property of rational white, high- and middle-class people as testified by the writings of Voltaire (1734), Hume (1753), and Thomas Jefferson (1776). Rational were only European males who owned property (Young 1996).

Besides value-laden and ostensibly scientific taxonomies, racist doctrines were also grounded in the conviction that a propensity to sin was transmitted through the blood and that aesthetical criteria could account for moral differences, that is what in Greek was called *kalokagathia*, the equation of beauty and health with the good that we find in the works of Plato, Plotinus and Augustine (Gracia Guillén in Alcalá 1984; Gliozzi 1990). These two elements ranked highly among the motivations driving the eugenics movement from its commencement at the end of the 19th century. A further source of legitimacy was Malthusianism. The paradox of Malthusianism is that the *philosophes* were particularly keen on reducing human actions and the laws of nature to calculable variables, and Thomas Malthus was unquestionably one of the purest heirs of the Enlightenment; but, as has been argued by Rudolph Binion (1998), his "Essay on the principle of population", first published in 1798, turned out to be a deadly blow to the utopian expectations of incessant social progress nourished by the *philosophes*. The premise of that essay, that the number of people increased more than the means of subsistence, simply cut the ground under the feet of those who believed that enlightened social policies would lead to the indefinite perfecting of all human beings and institutions. Malthus himself contended that thinkers who hold such views are *throwing us back again almost into the infancy of knowledge* (Malthus 1992). Ambroise Condorcet (1743-1794), a French philosopher and the inventor of "republican eugenics" (Testart 1994), was also the first to apply the calculus of probability to the study of social phenomena. Analogously, Francis Galton, the polyvalent scientist who coined the term "eugenics", had been trained as a mathematician and as a physician (Testart 1994) and enthusiastically applied Adolphe Quételet's law of the deviation from an average to his eugenic ends. He and his disciple Karl Pearson, both sons of rich Quaker families, fathered some of the survey techniques that are still applied these days but, hampered by class and race prejudices, instead of discerning actual causative connections, found spurious correlations. These were then employed to develop further, entirely unsubstantiated conjectures, arbitrarily assuming that they had ferreted out universally applicable laws of the inheritability of social and behavioural traits (Watts 1994; Graves 2001). Another eugenicist who took advantage of statistics to pursue his own political agenda was the American psychologist Henry H. Goddard, who introduced in the United States the Binet-Simon I.Q. testing, though in a revised version that presupposed the inheritability of intelligence, which was foreign to the original test. Its introduction also served the purpose of showing that social sciences should be judged as proper sciences (Dennis 1995).

This idea that human and social variability can be "tidied up" through statistical means is likely to exert an irresistible appeal for a certain kind of scientists. So much so that Sigfried Koller, a former German racial hygienist still in the Eighties felt confident that, paraphrasing the Latin saying *nomen omen*, *Hinter jeder Zahl ist ja ein Schicksal* [Behind every figure is a fate] and that *man kann das Menschliche in Zahlen sehr gut zum Ausdruck bringen* [that which is human can be expressed through numbers] (in Scherer 1990; 121). Also owing to the eugenicists' campaign for a clear-cut and orderly taxonomy of social variables, popular labels such as feeble-minded and pervert were reclassified as scientific categories and acquired the value-free character of statistical data (Watts 1994), even though their cardinal assumption was the biblical aphorism that "like begets like" (Gilman 1982).

Consequently, eugenicists would cling to five main tenets (Gilman 1982):

1. that acquired characteristics are inherited;
2. that heredity is a dynamic process beginning with conception and ending with weaning;

3. that character, disease, and temperament are inherited in the form of tendencies and predispositions (diathesis, or constitutional bent);
4. that sexes play a necessarily different role in heredity;
5. that miscegenation between races is corrupting on both a biological and moral plane.

This in turn made possible the emergence of aversive racism (Kovel 1988), an ostensibly liberal and tolerant attitude to minorities that really conceals the need to keep the out-group at a safe distance, and in so doing to evade racial anxieties about control and virility⁴⁶:

Scientific racism and genocidal fantasies of the eugenicists were no less cultural than contemporary articulations of racial difference. The crania, genitalia, and other body parts that were measured, exhibited, and stored in specimen jars in the temples of medicine were always eroticized, constituted through a politics of desire, which remains a calling of science.

Steven Gregory (in Rose Tricia et al. 1995: 21)

Finally, equally important is the role of metaphorical thinking at the level of scientific research and communication. Stepan (1986) has demonstrated that from the late Enlightenment the study of human variation made use of a series of pejorative metaphors to define racial, gender, and class inequalities that, combined with a biased examination of anatomical features and an even more prejudiced understanding of hormonal secretion, rendered scientific what had previously been mere common sense (Stepan 1986):

Frank Dikötter (1998) has criticised those researchers in the history of eugenics who exclusively address Western events and protagonists and neglect important instances such as China and India. The problem with such a reproach is that it presumes that, outside the West, eugenics had a considerable impact on the everyday life of lay-people. This at the very least a problematic assumption, unless we jumble together eugenics, sexology, social hygiene, and marriage counselling: an interesting solution that yet warrants the utmost caution and enormous critical elaboration. Focussing on Germany, the United States, Scandinavia, and contemporary China is only too natural given that those are the countries where eugenics politics have been or are being enforced. In other words we should not confuse social-policy thinking with social policy (Freedman 1983). Moreover, by and large eugenics was an elitist movement whose members were scientifically trained white men and white women working towards their enfranchisement (Brown 1988), and in my view there is no reason to believe that at that time it could flourish in a non-Westernised context. Even in fascist Italy eugenics and racial hygiene were regarded by the population as one of Mussolini's many whims, even though Italian eugenicists had a considerable influence abroad (Zimmermann 1992; Stepan in Adams 1990).

We should be wary of assuming with Gramsci and Foucault that the intellectual sympathies and political orientations of the elite are bound to be shared by the masses. Eugenics in Italy assured no short-term benefits and became a laughing-stock due to the considerable diversity of the Italian population (Maiocchi 1999). Most Italians simply ignored it, until Mussolini promulgated those racial laws, modelled after the German example, that turned thousands of people against the regime, guilty of aping the allies' worst practices. Another racist and authoritarian regime such as South Africa remained similarly indifferent to eugenics, mainly due to the growing evidence that the inheritability of cultural and behavioural traits was no longer scientifically sustainable (Appel 1989; Rich 1990). Like fascism, it recycled the same racist rhetoric in terms of cultural incompatibility and in so doing laid the foundation for apartheid. Eugenics cannot therefore be subsumed under any

⁴⁶ Interesting in this respect is the comparison made by a Japanese between Japanese and black sexuality: *la virilité des Noirs est extraordinaire, bien que leurs techniques sexuelles le soient moins* (Kozakai Toshiaki 1991 : 37)

unambiguous categorisation and its miscellaneous characterisation calls for a broad analysis of the cultural and ideological framework that gave rise to it.

These introductory reflections serve the purpose of laying the groundwork for the following attempt to explain why Germany, Japan, Italy, the USA, and South Africa all had segregationist discourses along racial lines but Japan and Italy did not enact truly eugenic laws⁴⁷.

Upon reviewing the corresponding literature, I have first to say that I cannot provide a definitive answer. It seems to me that the Catholic background of Italy was crucial. In Italy, Spain, France, and Latin America, possibly due to the hegemony of Catholic faith that thwarted all attempts to spread a morality grounded on biology⁴⁸ (Bachelard-Jobard 2001) and of neo-Lamarckism – promoting a belief in the inheritability of acquired traits – this reformist slant did not gain ground and social hygiene⁴⁹ eventually prevailed. My guess is that Mussolini must have sensed that eugenics would bring no benefit to his regime and the whole thing was called off. On the other hand Puritan excesses cannot possibly be the only responsible since the eugenics movement in Great Britain failed to put its schemes into practice, and China and Singapore, that have passed eugenics laws in recent times, hardly qualify as Puritan countries. At the same time, the adherence to neo-Lamarckianism did not invariably lead to benevolent social policies. Communism and fascism, resting on the assumption that human nature was malleable and that the social question was exclusively due to historical and structural causes, exacerbated social hygiene adding a totalitarian character to a project that originally had progressive foundations and radically distorting the underlying scientific principles (Graham 1977; Pogliano 1984; Maiocchi 1999). But whereas in Germany and Italy very few scientists put their careers on the line and next to none jeopardised their safety, in the Soviet Union numerous geneticists protested against the abuse of genetics made by Trofim D. Lysenko, an ambitious man with no credentials whatsoever except a few crucial connections with the establishment. All dissenters were removed from their positions and some of them were deported or executed (Kohn 1988). All things considered, a combination of factors that is difficult to disentangle accounts for such diversities, but this does not necessarily imply that drawing comparisons is fruitless.

Over the past thirty years social researchers and historians have demonstrated that eugenics, racism, nationalism, feminism, population control, and welfarist policies were everywhere intermeshed (Crook 2002). An additional element of this compound is the separation of sex and reproduction (Weingart 1987; Bayertz 1994b). Eugenics was meant to be the doctrine that would finally bring about the ultimate rationalisation, that of human reproduction, in furtherance of the two guidelines of modern life-governance, the disciplining and optimisation of the individual body within the collective body (species, nation), specifically through the control of sexuality.

Ironically, T.H. Huxley, unlike his son and would-be eugenicist Julian Huxley, but echoing a diffused sentiment (Kline 2001), dreaded the long-term consequences of eugenics because he thought that movement would go hand in hand with sexual radicalism, which was in turn bound to loosen family-bonds. But the nub of the problem was really that neo-Malthusians and eugenicists alike shared the belief that the social question was one and the same with the problem of sexual conduct and both should be dealt with by scientific means and through state-intervention (Drouard 1992). For instance French eugenicist Adolphe Pinard remarked that

Jusqu'à présent l'acte procréateur n'a été qu'un acte instinctif tel qu'il existait à l'âge des cavernes. C'est le seul de nos instincts n'ayant pas été civilisé. [...] Je pense, qu'une évolution ou une révolution s'impose à bref délai

⁴⁷ Japan in particular passed the Eugenic Protection Law only in 1948, under US military occupation. This law allowed for both voluntary and involuntary sterilization for 30 hereditary diseases and was repealed in 1996.

⁴⁸ According to Paul Weindling (Weindling 1987) the British Labour Party opposed the promulgation of eugenics laws in Britain because its leadership feared the prospect of huge defections among Irish workers.

⁴⁹ a number of interventions targeting environmental factors rather than inheritable traits

American geneticist Herman Muller held a similar view and his eugenic programme presupposed the separation of sexual intercourse and conception, the latter destined to be rationally designed and performed in the laboratory (Pauly 1987). British geneticist John. B. Scott Haldane in *Daedalus or Science and the future* (1925: 65) instead emphasised the more noble argument of individual self-determination: if reproduction is completely separated from sexual love, mankind will be free in an altogether new sense. Peter Weingart (1995) notices that premodern eugenic utopias already contemplated the aforementioned distinction and that what characterises modern schemes is a major focus on the modification of dysgenic institutions. But he omits to mention that sexuality was as important a factor in eugenics as it was and still is in racism (Breman et al. 1990). His oversight is all the more surprising as the close ties between eugenics, white supremacy, bourgeois ideology, and "proper" sexuality are manifest in science, literature, and newspapers reports. Ronald Takaki (Takaki 1978) has further explored this relationship and found out that, in the 1850s, Harvard medical students resisted the admission of women and blacks, not only because they felt that their status would be lowered, but also because Jacksonian society identified women with housewifery and purity, blacks with savagery, and whiteness with the accumulation of riches and knowledge; spheres these, that needed to be unequivocally separated.

It is noteworthy that the utopian futuristic societies in the novels of Zamiatin, Huxley, and Orwell all feature males who are sexually frustrated by unconventional females (Baker 1990). Shaw, Wells, and several other intellectuals at once supported women's liberation and sex radicalism, and the State management of childbearing (McLaren 1992). This seeming contradiction does add up once we consider the class and racial biases, widespread among intellectuals, that led them to discriminate between the right to take pleasure in the joys of sexuality and the right of procreating (McLaren 1992). The infiltration in the cultural fabric of whiteness, consisting of a moralised discourse of health, purity, balance and rationality (Goldberg 1999), of the licentious behaviour of feeble-minded and blacks, was inadmissible (Kline 2001)

Here we confront once again the deep ambivalence of modernity, torn between sexual restraint, moderateness, and respectability as a means of sublimation of the sexual drive, on the one hand, and eroticism and free sexual experimentation as a form of escapism from those iron cages of modernity demanding that very sublimation, on the other. George L. Mosse (1982) has abundantly made clear the connection of sexual normality and the bourgeois view of an ideal society. In the nineteenth century, abnormality was seen as the worst threat to a healthy, beautiful, and happy world, and these sentiments perfectly suited the nationalist call to sex control as the key intervention against the degeneration of society and the species caused by urbanization and industrialization and exemplified by sanitary emergencies and social conflict. Sex control was accompanied by the hedonistic, but entirely desexualised, bourgeois⁵⁰ idealization of the human anatomy and by an obsessive concern for individual health as the cornerstone of a healthy social body (Hau 2003). Naturally, while scientists were asked to find unchanging natural, social, and behavioural laws, physicians, although caught in a perennial struggle with the advocates of alternative, holistic methods of healing, gained an ever expanding authority on matters of appropriate conduct and life-style. They eventually saw themselves as redeemers and guardians of morality (Mosse 1982).

The identification of racial inferiority with unprincipled conduct was logically linked to the moral inadequacy of sensuous homosexuals and women, that transformed love into lust, true art into degenerate art, and brought to ruin a stable society grounded on an upright family life. This aversion to deviance from the norm stands out in the aforementioned utopian and dystopian novels, but also in the movie *Brazil* (Terry Gilliam 1985) where futuristic totalitarian societies could only be undermined by the liberation of the obscure forces of the sexual, the wild, the feminine, and the crepuscular. Uncontrolled erotic pleasure must not be permitted lest the perfect order built by a technocratic elite should fall apart. As I mentioned before, though, even those heroes who awake to the fact that the system is brutal and inhuman and must be

⁵⁰ For the movement called Lebensreform was mainly constituted by the members of the middle-class (Hau 2003)

combated are *all sexually frustrated males attracted to nonconforming or rebellious females* (Baker 1990: 31). I postulate that a parallel can be drawn between eugenic technocratic virilism and the machismo that still plagues the scientific world. Indeed, in my view Arnold Pacey (Pacey 1974) clearly has a point when he states that the pursuit of techno-scientific advance is somewhat compulsive, almost as though men should feel compelled constantly to prove their virility. The reverse of the medal is that the formerly enormous proportion of men in science has also encumbered the advance of progressive ideas in the realm of family planning and procreation. Witness biochemist N. W. Pirie's startling comment (Wolstenholme 1963: 283) on the subject of procreation:

I think that most of the impulse to have children is a cultural one, built up by the kind of stories you read, the kind of picture you see; I do not think it is a basic impulse at all. The impulse is sexual and that is the object people are pursuing; the children are inadvertent.

3.1 EUGENICS IN THE UNITED STATES: FROM FEEBLE-MINDEDNESS TO TRANSHUMANISM

If we continue to approach eugenics as merely an embarrassing mistake with little historical significance, we will never understand the movement's powerful appeal to generations of American concerned about the future of morality and civilization

Kline (2001: 1)

American eugenicists, like some other progressives, had little faith in the innate ability of men to solve social problems democratically. Their belief in naturalism caused this distrust of democratic politics; for eugenicists and many progressives recognized the animal origin of human nature and thereby assumed that for the majority of human the benefits of civilization were only skin deep

Pickens (1968: 3)

Tens of millions have been given to bolster up the weak and alleviate the suffering of the sick [while] no important means have been provided to enable us to learn how the stream of weak and susceptible protoplasm may be checked. [...]. Vastly more effective than ten million dollars to 'charity' would be ten million dollars to eugenics.

Committee on Eugenics of the American Breeders' Association (Cooke 2002)

At the end of the 19th century nearly 15 percent of America's population was foreign-born (Kline 2001). The United States were no stranger to the radicalisation of preventive measures as concerned immigration. Given the association of Italian, Irish, Jews, and Eastern European immigrants with pellagra, typhus, and lower intellectual faculties, the customary selection and regulation of immigration shifted from purely hygienic and medical criteria to more politically laden goals. After coming to terms with the fact that epidemics were not a permanent threat to the American social fabric, the advocates of immigration restrictions resorted to warnings against the contamination of the American genetic pools by certain groups of immigrants (Markel 1997). Additionally, it was argued that contagions could also be caused by doctrines thought to undermine the stability of American society and quarantine was applied not only to contaminated individuals but also to political activists of the "wrong kind" (Seidelman 1989). Meanwhile, several American geneticists such as Popenoe, Johnson, and East, driven by the conviction that the animal origin of human nature could not be curbed by civilisation, that society should emulate nature, and that their scientific expertise set them apart from the rest of the population, persevered in undermining the foundations of democracy by underscoring that as hereditary differences disproved the enlightenment notion of equality, then an aristocratic, oligarchic socio-political arrangement would be more suitable in the United States (Pickens 1968; Adams 1994).

Sadly, half of the geneticists actively promoted the American eugenics movement (Smith 1975). Among the most prominent, let me mention T. H. Morgan and Hermann Muller (Columbia), D.S. Jordan (Stanford), C.B. Davenport (Station for experimental evolution at Cold Spring Harbour, Long Island, New York), W. E. Castle (Harvard), E.G. Conklin (Princeton) and, more recently Joshua Lederberg (Stanford) and James D. Watson. Most importantly, according to Bentley

Glass (Glass 1986) American leading geneticists Castle, Davenport, East, Jennings, and Muller never changed their views about eugenics in the face of scientific evidence.

Some of them did not even try to dissimulate their racism. Stanford President David Starr Jordan, ichthyologist, biologist and pacifist, submitted that (Jordan 1910)

We know that the actual blood in the actual veins plays no part in heredity, that the transfusion of blood means no more than the transposition of food, and that the physical basis of the phenomena of inheritance is found in the structure of the germ cell and its contained germ-plasm. But the old word well serves our purposes. The blood which is "thicker than water" is the symbol of race unity. In this sense the blood of the people concerned is at once the cause and the result of the deeds recorded in their history. For example, wherever an Englishman goes, he carries with him the elements of English history. It is a British deed which he does, British history that he makes. Thus, too, a Jew is a Jew in all ages and climes, and his deeds everywhere bear the stamp of Jewish individuality

And about the nature-nurture debate (Jordan 1915)

The progress of each race has depended on its own inherent qualities. There has been no other leverage. Physical surroundings have played only a minor part. To say that one race as a whole is inferior to another is only to repeat what is said every day of individual men. This does not imply that a lower race may not produce its own prophets or scholars or heroes. That race is lowest which shows, on the whole, least capacity for self-elevation. [...] In general, the highest range of possibilities in every field has been reached by the "blonde races" of Europe.

Likewise, Harvard geneticist and eugenicist E.M. East in 1919 (Allen 1983: 118), commingling Malthusianism and white supremacist thought, declared that

it is...an illogical extension of altruism [...] to seek to elevate the black race at the cost of lowering the white; [...]. In reality the negro is inferior to the white. This is not hypothesis or supposition; it is a true statement of actual fact.

Differently from the UK, in the USA the same eugenic themes caught the attention of the public opinion. By 1928, 376 college courses on eugenics were run in the USA (Allen 1989) and several laws were promulgated to meet the concerns of the population, such as the fancied multiplication of deviants, homeless, hobos, and beggars, and the equally imaginary invasion of immigrants of "inferior stock", all lumped together, branded as "feeble-minded" and judged to be a threat to the WASP lifestyle and to the cultural and biological legacy of the founding fathers (Roger in Benichou 1989). Ironically, beginning from the 1917, the I.Q. of 1,700,000 American conscripts of the U.S. Army were examined, and the outcome was disheartening. The average mental age was of 13 years for the whites and 10 for the blacks and recent immigrants. Nearly half of the white conscripts fell in the category "feeble-minded" (Paul 1995). Such was the embarrassment that the whole thing was kept secret until 1921 (Roger in Benichou 1989).

Even those American geneticists who did not openly espouse the eugenic cause or those who disowned it when it became clear that racial discrimination would play an essential part in eugenic policy-making, failed to take an unambiguous stance in the public arena and in so doing favoured the persistence of the worst instances of scientific racism and class-prejudice (Allen 1978; Beckwith 1993). For instance, James H. Sang recalls (1997) that professors seldom made reference to the biological foundations of the Nazi ideology so that he learnt about that only shortly before the outbreak of WWII when he was asked to oversee the publication of a book meant to disprove them.

This is all the more disconcerting as the relationship between American and Nazi eugenics is being thoroughly examined (Kühl 1994, 1997), and what is emerging is a picture as complex as it is disturbing of two cross-fertilising academic settings mutually reinforcing the audacity of their statements and proposals and dramatically influencing a number of social movements ranging from feminism to nationalism, and from social hygiene to the institutionalisation of the mentally retarded and the welfare state (Crook 2002). Notably, it is by now commonly acknowledged that the Nazi sterilization laws had been modelled after those of California (Kline 2001).

In this sense, it is remarkable how Virginia was reluctant to repeal its laws concerning the compulsory sterilization of handicapped people before 1974 (Tudge 2002), after upward of 7,600 citizens, mostly poor women, had been sterilized.

Analogous laws in several other American states led to the enforced sterilization of an estimated 60,000 to 100,000 people⁵¹. Buchanan's comment (2000: 38) on that count is that the analogies between American and Nuremberg laws are unsettling. As a matter of fact there is a virtually unanimous consensus that American eugenics and racial laws set an example for the Nazi theorists and policy-makers (Seidler & Rett 1982). A telling example is the "Act to preserve racial integrity", enacted by the state of Virginia in 1924 (Smith 1985: 156):

It shall hereafter be unlawful for any white person in this State to marry any save a white person, or a person with no other admixture of blood than white and American Indian. For the purpose of this act, the term "white person" shall apply only to the person who has no trace whatsoever of any blood other than Caucasian; but persons who have one-sixteenth or less of the blood of the American Indian and have no other non-Caucasian blood should be deemed to be white persons

The rationale behind this outrageous resolution had been provided in 1927 by Carrie Buck's sterilisation case. In the "land of freedom" justice Olivier Wendell Holmes accounted for the decision to proceed with the sterilisation as follows:

we have seen more than once that the public welfare may call upon the best citizen for their lives. It would be strange if it could not call upon those who already sap the strength of the State for these lesser sacrifices, often felt to be much by those concerned, in order to prevent our being swamped with incompetence. It is better for all the world, if instead of waiting to execute degenerate offspring for crime, or to let them starve for their imbecility, society can prevent those who are manifestly unfit from continuing their kind. The principle that sustains compulsory vaccination is broad enough to cover cutting the Fallopian tubes...⁵²

We should also mention the campaign for compulsory sterilisation in American colonies such as Puerto Rico, where at least 21% of polled women responded that they had been sterilised; and the Ford Foundation's Colombian experiments, in which 40,000 poor women were sterilised in exchange for lipsticks (Christa Baatz in Roth 1984).

Eugenic measures were more often than not taken on ludicrous grounds such as "excessive masturbation", "immorality" and "hereditary degeneracy"⁵³. The fact is, what seems preposterous to us nowadays, was common currency in certain segments of the American society during the first decades of the last century. From the 1910s onward feeble-mindedness, viewed as the root of all evil (Paul 1995), was assimilated to women's sexual licentiousness and its corollary was that motherhood was not a right but a privilege that could only be granted to responsible and respectable women (Kline 2001). It is thus erroneous to lay too strong an emphasis on the decline of hereditariness as the root-cause of the downfall of American eugenics. Eugenics in the US rather comprised both hereditarianism and environmentalism – this latter bolstering those charity initiatives that strict hereditarians dubbed as dysgenic and financially inefficient – and it is important to keep in mind that before 1915 the neo-Lamarckian mechanism of inheritance of acquired traits had yet to be dismissed (Cooke 1998).

At about the same time that Mendelianism triumphed, its implications dawned on leading geneticists such as Edward East, who pointed out that eugenics policies would be in vain, given that it would be impossible to detect all heterozygote carriers of feeble-mindedness (Paul 1995). In 1917 it was calculated that over 10 percent of the population might carry the recessive gene. Yet this conclusion did not discourage eugenicists, not even those with a strong background in genetics. Most of them deduced that eugenics programmes had to be further expanded in order to be effective (Paul 1995). In the last analysis, those citizens who were expected to exhibit the most rational behaviour turned out to be those who acted most foolishly, proposing measures that flew in the face of hard scientific evidence and reliable statistical estimates.

Nevertheless it is fair to say that there were some moderate and anti-deterministic eugenicists such as embryologist Edwin G. Conklin (1863 – 1952), who criticized those geneticists such as Davenport who, owing to his strictly Mendelian

⁵¹ Commencing with Indiana in 1899, thirty-five North American states eventually permitted the eugenic sterilization of mentally handicapped people. [...]. Both American eugenicists and their admirers in Germany stressed the enormous costs to taxpayers ensuing from anti-social families such as the Jukes, and of public asylums (Burleigh, 2000, p. 346)

⁵² Smith (1993: 5)

⁵³ <http://againsthewilljournal.com> 2002 Winston-Salem Journal

outlook, appeared to rule out of consideration the process of development. Conklin also lamented that such an unsoundly steadfast attitude gainsaid the mainstay of the American dream, according to which individuals had a daunting potential of self-improvement, especially through education (Cooke 2002). Most interestingly, we do know that factors outside the domain of scientific research may have prompted him to hold on to his moderate views on human selection. In spite of being born to and reared by two healthy and educated parents, one of his sons was mentally retarded (Cooke 2002). In view of the fact that James Watson may have radicalised his position due to the birth of a child with a severe neurological disorder, it would be interesting to explore the possibility that such private concerns could have a stronger influence upon science than previously thought.

However that may be, when an exclusive focus upon heredity became untenable, also due to the public outrage stirred by the Nazi crimes, eugenicists simply dropped it and confined themselves to the formulation of social reforms (Kline 2001). Which does not necessarily imply that eugenics as such had been relinquished. On the contrary, some geneticists realised that the circumstances were not propitious for planned human selection and resolved to wait for a time when techniques would be devised that would enable couples to design their offspring and when the principles of egalitarianism would not stand in the way (Mayr 1982; Cooke 2002). Watson and other like-minded scientists believe that the time has come to complete the eugenic project and the United States will unsurprisingly be the setting of such an enterprise. I say unsurprisingly because an enduring American characteristic is that Americans are enamoured of two concepts that may favour neo-liberal techno-eugenics: (1) the heritability of success and failure; (2) individual accountability (Cooke 2002)

This peculiarity has given rise to a specific subculture that has been dubbed Californian Ideology by Richard Barbrook and Andy Cameron, members of the Hypermedia Research Centre of the University of Westminster, London⁵⁴. Californian ideology is an offshoot of cyberculture, a worldwide subculture whose most radical adherents dream of a new order, the overturning of the outdated conventions and schemes to the benefit of a more libertarian, harmonious, decentralized, enriching reality. They sometimes do not disdain to employ colorful and vaguely subversive expressions. For instance, in its first issue, *Mondo 2000* (n. 1 1989) proclaimed that

the cybernet is in place...The old information élites are crumbling. The kids are at the controls. This magazine is about what to do until the millennium comes. We're talking about Total Possibilities. Radical Assaults on the limits of biology, gravity and time. The end of artificial Scarcity. The dawn of a new humanism. High-jacking technology for personal empowerment, fun and games

Ziauddin-Ravetz (1996: 83)

Barbrook and Cameron have detected in California a promiscuous aggregation of values and attitudes of both hippies and yuppies leading to a new utopia, typified by the *bio-technological manifestation of the social privileges of the "virtual class"*. [...] *What Wired magazine and the Extropians and other leaders of this Memes cult are doing ... is basically recycling Herbert Spencer's social Darwinism*

This Californian ideology is giving birth to a neo-eugenic movement called trans-humanism⁵⁵ or extropianism, *the culmination of the Western experiment in rights and reason*, as Erik Baard⁵⁶ jokingly defined it – but they would probably take that remark seriously⁵⁷ –, that is no longer confined to the American West Coast. Its members, or I should rather call them adepts, advocate the control of human development through gene modification as the only means of salvation faced with an increasingly compromised environment:

⁵⁴ see <http://cci.wmin.ac.uk/HRC/ci/calif5.html#1>

⁵⁵ Short for transitional human, along the path towards post-humanity

⁵⁶ The Village Voice, July 30 – August 5, 2003

⁵⁷ We shall regard ourselves as a form of art, we are the architects of our existence (Max More as quoted by Christoph Keller 2003)

Transhumanists are biotech absolutists. They claim humans should not merely be allowed to metamorphose themselves through surgery, cybertechnology, and the like, but should have the right to control the destiny of their genes by means of progeny design and fabrication

Wesley J. Smith (National Review online, Sept. 20, 2002)

These neo-Nietzschean paladins of the "transvaluation of values" are strongly adverse to the notion of sanctity of life and the traditional view of personhood and as misanthropic as they come in postmodern times. They promote the use of cryonics, robotics, nanotechnology, cloning, human germ-line engineering, AI, and space colonization (Elliott 2003). 90 percent of transhumanists and extropians are relatively young, highly educated, upper class, male (Margaret Somerville, globeandmail.com, Friday, Aug. 29, 2003). Their radical libertarianism is simply unrestrained and drives them – I cannot say how consciously – to denigrate our aspirations to a community of compassionate equals and in so doing to disown our common humanity (Walker 2000).

The fact that so many educated, accomplished people seem untroubled by it is truly frightening. It's the materialist-reductionist-determinist worldview run amok. It's what happens when people become disconnected from themselves, others, and nature. I've been at conferences where participants use phrases like "when we start engineering our children" as if it's a foregone conclusion, with no indication that they appreciate the enormity of what they're saying

Richard Hayes (in Walker 2000: 87)

Analogously, bio-ethicist Carl Elliott (Elliott 2003), evaluating his participant observation of a transhumanist conference held at the university of Yale, insightfully remarks:

I was struck more by its religious overtones. The transhumanists have their sacred texts, "The Engines of Creation" and "Mind Children" among them. They have communal gatherings, which usually occur online. They have a set of beliefs about resurrection and the afterlife, couched in the language of cryonics and computers. They divide the world into believers and infidels (the "bio-Luddites"), and they call on one another to evangelize - or, as they often put it, "spread our memes." Many transhumanists believe that we're approaching an apocalyptic end-time they call "The Singularity," a convergence of technological developments that will push the rate of change so dramatically that the world could be transformed beyond recognition. The WTA states that if The Singularity comes, it will probably be caused by the creation of self-enhancing, superintelligent beings.

Together with their utter disdain for ordinary moral sensibility, these are all traits that they share with classic eugenicists. This impression is further corroborated by Elliott's warning that it would be unwise to discount such a movement for it combines ideological strands that are deeply rooted in the American society. Among them he mentions the ideology of libertarian individualism, a repressed religious yearning that leads to ostensibly irreligious claims that are really a form of sectarianism and, last but not least, technocratic idealism. We should also add a considerable emphasis on the fulfilment of narcissistic proclivities (K.A. Pearson 1997).

Elliott correctly notes that the issues raised by the transhumanist movement are the same that we will be confronting as enhancement technologies are increasingly refined. What he fails to recognize is that those battles have already been fought in the past, and on the same ideological grounds. It is by looking back at what eugenics represented for thousands of specialists and lay-people alike that we can better understand the success of books such as Lee Silver's "Remaking Eden: cloning and beyond in a brave new world" (1998) and Gregory Stock's "Redesigning Humans. Our inevitable genetic future" (2002), that follow the same lines of previous utopian and dystopian popularisations of science and eugenics (viz. Galton's, Ploetz's, Wells's⁵⁸, Huxley's, etc.). Lee Silver, a molecular biologist and neuroscientist, outlines one of the most likely scenarios following the massive application of germline engineering in a regime of free market (ibid. 249), namely the emergence of a class of genetic aristocrats (*GenRich*) that will seize control of the mass media, the economy and the high finance, as well as technoscience:

When the first generation of cognition-enhanced GenRich matured, they produced among themselves scientists who greatly outshone geniuses from all previous epochs....and they created more sophisticated reprogenetic technologies, which they then used to enhance cognition even further in the GenRich of the next generation.

⁵⁸ Incidentally Gregory Stock quotes H.G. Wells' "the Time Machine"

To him, that this is more than just a possibility is witnessed by the fact that some parents are prepared to spend huge sums of money to provide their children with an excellent education and *if parents are willing to spend this money after birth – with no guarantee of a return on their investment – why not before?* (Lee in Stock & Campbell 2000: 60)

Their artificial evolution would eventually lead to such a genetic gap that some of them would no longer be able to cross-breed with the “natural humans”, that is to say, the human species would branch off. This assessment nicely hangs together with Gregory Stock’s prophecy that our descendants won’t see our age as that in which our planet has been exploited to the point of compromising natural diversity, but rather as the beginning of a new bio-historical phase in which artificial diversification would bring with it a richer variety of species (Stock 1993).

Stock’s ideal of *Übermensch* is equally daring and somehow resembling the original Nietzschean ideation, although in a more impoverished form (Stock 2002). He speaks of channelling of human lineages and inbred professional specializations and, in a book that according to James D. Watson reveals the compassionate side of science (Stock 2002), Stock displays a rather alarming lack of sensitivity and concern for the fate of democracy, egalitarianism, dignity, and free will when he clarifies that

If a society believes that women are (or should be) more empathetic and supportive, and boys more aggressive and independent, then whether or not these gender specificities are true now is not as important as the likelihood that they will gradually become true

By the same token, he suspects that, as far as human conception is concerned, the move from bedroom to laboratory, which some day will no longer be optional, will be no more dramatic than that from giving birth at home to medically assisted birth in a hospital.

The peculiar hypocrisy of a member of the upper classes purporting to be the champions of rights of the masses to take advantage of a meritocratic social arrangement, is not uncommon among neo-eugenicists (Stock 2002: 190):

Strong voices will oppose this [genetic enhancement], but most of the warnings... will come from people with the most to lose – the well-endowed elite. Surely theirs are the children who would ultimately suffer from the arrival of a genetic bazaar where all parents can obtain equivalent talents and potentials for their children. [...]. Now a new elite may wince, because if the God-given gifts of talent are suddenly laid out for everyone else, their future would not be so secure.

That this is an elitist, reactionary and deterministic discourse is clearly proven by the fact that Stock presumes that elites maintain their social position thanks to their superior genetic endowment and not to the ceaseless exploitation of the economically and socially underprivileged. This feeling is substantiated by the following remark (Stock 2002: 187):

As society moves closer to becoming meritocracy, the most talented from all ethnicities and backgrounds will intermingle, form partnerships, and mate with similarly talented and successful others. Over time, this self-sorting will tend to divide society, increasingly distancing the more gifted from the less. Narrowly limited genetic screening and enhancement technology would accelerate such divisions and reinforce privilege, whereas broadly available technology would counteract them

It is for me intriguing to witness such a revival of the Nietzschean project of conscious and witting self-enhancement in concomitance with the arising of huge expectations about the ability of techno-science to free mankind from toil, pain, and aging. Nietzsche himself (Nietzsche 1996, Aphorism 128: 89) had pointed out that

Modern science has as its goal the least pain and the longest life possible – that is a kind of eternal happiness: to be sure a very modest kind in comparison with the promises of religion

In fact I see a remarkable affinity between the arguments expounded by the boldest advocates of genomics and the rhetoric formerly typifying progressive eugenics. Particularly striking is the utopian character of their formulations, which seems to point to a direct relation between elitism and utopianism, as though utopias were apt subtly and efficaciously further to concentrate power in the hands of the upper ranks of society (Bof in Colombo 1987).

I believe it is easy to foresee that such stands are apt to undermine the foundations of our communal life and respect for human life as such. In other words, if these views should be given credence, it stands to reason that before long we would be offered biotechnologies designed to follow through on the nihilists’ demand for self-purification (negative

eugenics), the mitigation of self-hatred (positive eugenics) and of the sense of inaptitude (cloning as the ultimate gainsaying of self-doubt). That would be the age of the Underground Man, of self-sollicitous individuals incapable of true love (Scanlan 1999). A possibility that is by no means acknowledged by well-intentioned idealists such as the president of the German Transhumanist Society, Frank Prengel (Keller 2003: 10):

Sie wollen das ewige Leben?

Warum denn?

Weil Ich darunter leide, weil Ich es zum Verzweifeln finde, dass meine Persönlichkeit, meine Intelligenz und alle Kenntnisse, die Ich im Verlauf meines Lebens erworben habe, mit dem Tod meines biologischen Körpers vernichtet werden, weil Ich den Tod als eine ungeheure Verschwendung von Wissen betrachte

[Would you like to live forever? How come? Because I fear, I find distressing, that my personality, my intelligence, and the whole of the knowledge I have acquired throughout my life, will be lost with the death of my biological body, because I regard death as an enormous waste of knowledge]

3.2 EUGENICS IN SWEDEN

Most if not all scientists participating in the Norwegian eugenics debate were "progressives".

Roll-Hansen (1980: 296)

The experience with Nazi policies had limited direct impact and was not decisive for the eventual abandonment of eugenics in Scandinavia. Nazi policies and practices were widely considered a perversion of eugenic ideals and goals with little relevance for their true evaluation.

Roll-Hansen (1989: 343)

The 15 to 20 per cent of those at the lower levels of society - those who are not able to manage even the simplest tasks and often not their children - should be dissuaded from having children.

Prof Helmuth Nyborg, the dean of the Psychology Institute at Aarhus University (Telegraph 1/10/2003)⁵⁹

Scandinavian eugenics is an even more fascinating topic for the light it sheds on the emerging new eugenics in advanced democracies. In 1922 the first European research institute for race biology was established in Sweden (Müller-Hill in Clarke 1994). Eugenics laws on voluntary sterilisation⁶⁰ were enacted in Denmark in 1929, in Norway in 1934, in Sweden in 1934, and in Finland 1935 and have been repealed relatively late (Denmark 1967; Sweden 1976). In Weimar times the eugenic society numbered among its members nearly all the most important German and Scandinavian biologists and Alain Drouard (Drouard 1999), examining the correspondence between Lundborg, the director of the institute of racial biology in Uppsala, Sweden, observed that he liaised with some prominent French eugenicists in the 1920s and 1930s and also with some of the most questionable eugenic thinkers in Germany (von Verschuer, Fritz Lenz, Eickstedt, Otto Ammon, Hans F.K. Günther), in the UK (Leonard Darwin), and in the USA (Charles Davenport, Harry Laughlin). At the same time Lene Koch (Koch 2002) points out that scientists from democratic countries such as Denmark did not part company with those German scientists who had been implicated in criminal and unethical activities during the Third Reich. The scientific value of their research was sufficient a motive to drop their past into oblivion.

Nils Roll-Hansen (1989a, b) has postulated that five main factors were involved in the growth and the subsequent phasing out of eugenics in Scandinavia:

1. the decline of traditional moral norms linked to Christian religion;
2. the widespread conviction among the medical and scientific professions that Nazi policies were a perversion of eugenics ideals that could not be compared to the features of a purported "Scandinavian way";
3. the ups and downs in the popular perception of the role of the State in their life;
4. the steady expansion of knowledge about human heredity;
5. a cultural shift favouring individualism;

However, Pietro S. Colla, in a remarkable piece of scholarship (Colla 2000), has successfully challenged the acquiescence displayed by Swedish scholars when dealing with the history of eugenics in their own country, a deference that stems from their a-critical acceptance of the welfarist schemes implemented by their country. His work manages to convey a different understanding of eugenics as a worldwide phenomenon by drawing our attention to the wealth of attributes that intimately relate it to the advancement of modernity. In order to understand the reasons behind the persistence of

⁵⁹

<http://www.telegraph.co.uk/news/main.jhtml?xml=/news/2003/10/01/wpsy01.xml&sSheet=/portal/2003/10/01/ixportal.html>

⁶⁰ To what extent sterilizations could be voluntary remains a moot point

sterilisation laws in Sweden long after the end of the WWII, one must first of all bear in mind that the incompatibility between democracy and social control on reproduction is a late acquisition of democratic thought⁶¹.

However, it is also important to remember that although the theorization of eugenics was a worldwide phenomenon, its application only occurred in countries with a strong puritan and progressive cultural background inspired by the abstract egalitarian ideal of an "upward adjustment". Most significantly, before contemporary China there had not been a single case of communist, fascist, or simply military dictatorship carrying out even a mild eugenic policy. So for instance in the United Kingdom the alliance of the Church with the Labour party, exceedingly sensitive to the mood of its Irish voters, simply nipped in the bud all attempts to pass an eugenic legislation, no matter how watered down. Even so, that in a democratic society the curtailment of individual freedom is possible on account of the pursuit of universal well-being constitutes the most conspicuous paradox and intrinsic weakness of democracy, one that we should always bear in mind (Colla 2000). Colla has presented a number of arguments that refer to the specific case of Sweden but that also turn particularly serviceable to my attempt to undermine the current downplaying of the risks inherent to the application of reprogenetics innovations.

In Sweden the debate about healthcare and social utility garbled the meaning of hygiene and social virtue: hygiene came to comprise ethical and chauvinistic aspects that had been formerly altogether alien to it. On the other hand racism was not the only factor that conspired to turn social hygiene in a form of racial hygiene. In fact the idea of a "chosen Volk" did not saturate the public and parliamentary debate. Like their Weimar's equivalents, Swedish politicians were more concerned about social utility, efficiency, and productiveness than about romantic notions of metaphysical purity. Consequently it is humanitarian and utopian considerations that were referred to rather than the brutal eliminationist paradigms that would prevail in Germany. A case in point is the advertisement circulated by milk producers that in a way epitomizes the ideological climate of Sweden in those years:

Ett friskare släkte är målet...låt oss alla bli A-människor!

[the goal is a healthier race...let's all become A-men⁶²]

The irony embedded in this framework of reference is that medical professionals, some of the most enlightened representatives of Swedish culture, found themselves fighting on the same side as the farmers and the clergy against the purported degeneration of pristine customs and the extinction of traditional values among urban workers. Some citizens were simply deemed so undignified, irresponsible, and genetically unsuitable that they could not possibly be able to partake of the construction of that ideal society that social engineers were striving for.

Criteria for the selection of the citizens who would be sterilized comprised not only branding people who seemingly could not be brought up to the ideal standards as *sinneslö* ("mentally impaired") but also included sexual exuberance, sexual excesses, impudence, being *sexuellt opålitlig* ("sexually undependable"), anti-conformist, *hållningslös* ("fickle"), *lätteledd* ("easily influenced"), *vidhyftig* and *lösaktig* ("licentious"), or *konstig* ("weird"). As a result, to get rid of the *avfallsprodukter* [cast-offs] of Swedish society was a humanitarian endeavour – axiological rationality – rather than the brainchild of the unsound and misguided use of instrumental rationality.

Predictably, experts of family-planning and feminists found a huge appeal in such an approach that valued rational and far-sighted behaviour over traditional, *passé* codes of conduct. In this respect, Colla correctly relates the reaction of believers confronting sin and the sinner to the approach of eugenically-minded people before illness and the sick. As the

⁶¹ This argument most certainly applies to Meiji Japan and to some intellectual circles and political formations of Weimar Germany. For instance, Hitler's *Gesetz zur Verhütung erbkranken Nachwuchses* (1933), did not break away from Weimar's legislation and when the trials against the Nazi establishment got started the overwhelming feeling that treating forcible sterilization as a crime against humanity would indict suchlike measures adopted in the United States was sufficient to induce the prosecutors to evade the issue altogether.

⁶² as opposed to qualitatively inferior B-men (*undermålig* in Swedish)

hatred for sin ever so many times translates into intolerance if not the out and out persecution of the sinner, so the dread of a specific disease would lead some to despise and detest the sick:

La liberazione della società dalle sue malattie sociali trascenderà facilmente nel progetto di annientare i soggetti sociali – deboli, malati, indocili – che, con la loro stessa esistenza, ne recano testimonianza

[the freeing of society from its social ills will easily transcend into the project of annihilation of those social subjects – the weak, the sick, and the unruly – who, through their very existence, bear witness to them]

Colla (2000: 13)

Another important aspect of the question is the pervasive presence of religious metaphors and declarations of missionary commitments to the enhancement of Swedish society that invoked the principles of “love thy neighbour as thyself” and broadened its application to encompass to future generations, as well as the concept of wrongful birth and the right of parents to raise healthy children, to justify the most uncompromising eugenic measures.

Drawing on the history of eugenics respectively in Scandinavia and Canada, Roll-Hansen (1989a,b; 1996; 2001) and Angus McLaren (1990; 1992) have successfully stressed the point that in those countries most eugenicists were more progressive than their opponents. The one analogy that I find most striking between Sweden and Canada is the relative absence of social criticism in the name of an aseptic political correctness and a relativism of values more imposed from the outside than readily embraced that has as its ultimate upshot the preservation of those dogmas established and strengthened by an elite that, in a burst of self-serving enthusiasm, regards itself as more modern, progressive and boldly experimentalist than its opponents. Resistance to change within these rationalist utopias is in turn made possible by the conviction that a social system that has become a model of progressive and enlightened administration for foreign policy-makers cannot possibly constitute a problem or an enigma, and that the adoption of an ethically grounded welfare state is sufficiently commendable to challenge all sorts of critiques, for what truly matters is, after all, not the methods but the aims. Colla (ibid. 2000) has termed this inclination “moral untouchability” and finds that one of its best expressions is the aphorism on the gate of the university of Uppsala: *Att tänka fritt är stor, att tänka rätt är större* [free thinking is great, but correct thinking is even greater]⁶³.

The reasoning of German feminist Gertrud Bäumer best exemplifies what sort of ideological background had facilitated the alliance of feminism and racial hygiene in the name of progressivism and democracy:

*in its connection with eugenics, this old ideal [liberal humanism] becomes more corporeal, more concrete. Even now it retains its universally valid, all-encompassing significance. Because the improvement of the race means the improvement of all. Demands of racial politics are by nature democratic inasmuch as they necessarily apply to all and cannot be limited to the confines of a single class*⁶⁴

⁶³ In this regard, I wonder whether it is a coincidence that it was precisely in Uppsala that the Swedish institute for racial biology was founded in 1922

⁶⁴ Repp 2000: 180

3.3 EUGENICS AND RACIST BIOLOGY IN JAPAN AND SOUTH AFRICA

"workers" in my house were not the same skin color as "family" and "friends". My whiteness was a "sign" that I was not destined for "menial" tasks

South African professor (Steyn 2001: 52)

Perhaps the entity called Aom Shinrikyo resembles pre-World War II Manchuria. Japan established the puppet state of Manchuria in 1932, and in the same way, the best and brightest - the cutting-edge technocrats, technicians, and scholars - gave up the lives promised to them in Japan and went off to the continent they saw as so full of possibilities. For the most part they were young, extremely talented, and well educated, their heads full of newly minted, ambitious visions. As long as they stayed in the Japanese state, with its coercive structure, they believed it was impossible to find an effective outlet for all their energy. And that's exactly why they sought out this more accommodating, experimental land, even if it meant jumping off the normal track. In that sense alone they had pure motives, and were idealistic, filled with a sense of purpose. As far as they were concerned, they were proceeding down the "proper path". The problem is that something very vital was lacking. Now we can look back and see what was missing was a properly three-dimensional historical sense, or, in a more concrete level, an identity between language and actions"

Murakami Haruki (2001: 306-307)

The part played by intellectuals in the hegemonic discourse of Japanese "fascism" and eugenics is particularly instructive. Alessandro Gomarasca (2001) and Sabine Frühstück (1998)⁶⁵ note that the slogan of Meiji Japan's social reformers was *bunmei kaika*, literally "civilize, enlighten". The main concern of the period was to rectify the everyday life of a people whose fate, they claimed, hinged on how quickly Japanese civilization would catch up with Europe and North America. This led to the scientific programming of the individual body in its growing and decaying as the individual body mirrored the national, collective body in the organicistic conception of Japanese society that was largely established by the end of XIX century. According to this vision the health (*eisei*) of the State depended on public hygiene (*keōshō eisei*). The body politic was therefore nurtured, dressed, and sanitised in an appropriate manner, by adopting Western customs, fashions, and habits, all of which was instrumental to the Japanese supremacy policy over the Far East and the Western Pacific Basin (Saitoh in Kawakita 1993). This hugely ambitious scheme was carried out by taking Germany as a model:

the reticulated elaboration of Japanese concepts of uniqueness in the modern period is immensely indebted to the theoretical world of German nationalism. The discovery in mid-Meiji of a strong affinity between Japan's situation and that of Germany's late modernisation led to an increasing dependence on the German example, to legitimise the authoritarian heritage of the Tokugawan state while ostensibly remaining faithful to modernisation on Western lines.

Dale (1986: 214)

Historically, a continuous flow of know-how from Germany to Japan took place in consequence of the attendance of carefully selected German universities by several hundreds of Japanese students⁶⁶. Following this first contact at an academic level, a number of German experts of law, economics, and natural sciences were invited to partake in the ambitious project undertaken by the Japanese government to establish an academic institution capable of competing with the venerable and prestigious European universities. This choice to have recourse to German counsellors was to play a determinant role. Indeed Martin (1995, 34) has shown that the brand of juridical and political-economic studies (conservative and elitist), and bio-medical experimentation (social Darwinism and racial theories) imported from Germany helped to establish an authoritarian system and to provide it with an ideological superstructure. The Japanese understanding of eugenics – translated as *yūzenikēkusu* or *yūseigaku* that is, the science of superior birth – derived from the German doctrine

⁶⁵ Frühstück Sabine, 1998, *Germs, Genes, and Nerves: Programming the Body in Modern Japanese Medicine and Allied Science*, 1998 AAS Annual Meeting, Session 174

⁶⁶ 408 students between 1881 and 1905 (Martin, 1995)

of the racial hygiene of the *Volkskörper* (*kokutai*) (Richter & Schad-Seifert 2001). Also from Germany Japanese took their cue when it came to set up a nationwide network of marriage and eugenics counselling centres superintending quality control of population growth and racial hygiene (Richter & Schad-Seifert 2001). Additionally, the orderly, ambitious, and recently formed German empire soon appeared to mirror the aspirations of Meiji's regime. Obvious was the link between the diffusion of eugenic theories and the necessity to advance the Japanese process of modernization and westernisation (Otsubo & Bartholomew 1998). In fact, the accompanying ominous slogan was *bukoku kyōhei*, i.e. "rich nation, strong soldiers" (Aya Homei 2000).

Hence, throughout their history as world-powers – with the brief exception of the WWI – the two countries continued to entertain dangerous liaisons, which ultimately wound up in the unparalleled massacre of WWII. The preparations for the impending war, that broke out when the Japanese army invaded China in 1937, busied dozens of Japanese scientists and technicians at Ping Fan, in Manchuria, at the time a Japanese colony called Manchukuo. There a centre for the experimentation of biological warfare had been established, that employed around 3000 people and in which no qualm existed as regards the use of human beings as guinea pigs for the development of those bacteriological weapons that were meant to bring China, and possibly the Soviet Union, to their knees (Williams & Wallace 1989). The project was more or less covertly backed up by a considerable number of Japanese scientists who, unsurprisingly, got away with their complicity in one of the most outrageous instances of biomedical science run amok (Barnaby 2000). These human experiments (*Jintai Jikken*) on Russians, Chinese, Mongolians, and Koreans were conducted between 1933 and 1945 by Japanese doctors and biologists enlisted in the Unit 731, Unit 100, the Manchuria Medical School, and the army hospitals, and caused thousands of victims. Takashi Tsuchiya, an associate professor at the Department of Philosophy of Osaka City University writes in a remarkably straightforward article⁶⁷ that

except at army hospitals, most of the doctors who performed human experiments and vivisections were academic researchers who had been lecturers or associate professors at leading Japanese medical schools and were temporarily employed by the Japanese Army

Interestingly, unlike their German equivalents, Japanese medical students were not imparted any specific ethical training nor were they expected to take the Hippocratic Oath. Their educators would simply presume that they were fully aware that theirs was a calling to beneficence, not to malfeasance or murder (Harris 1994). However the physician and microbiologist who was appointed head of the programme, Ishii Shiro, was of a different mind. Womaniser and heavy drinker, one of his colleagues described him as follows (Harris 1994: 17):

he is very clever and a hard worker. However, he is not a scholarly minded person. He is very ambitious and likes to do big things (in a way he is a boaster). He is very eager about promoting himself to a higher position by achieving meritorious deeds

In tune with his temperament, he proclaimed that no scruples should get in the way of scientific and patriotic research, in a fashion that disturbingly resembles the justifications offered by the scientists involved in the Manhattan Project:

the research work upon which we are now about to embark is the completely opposite of these principles [of medical conscience], and may cause us some anguish as doctors. Nevertheless, I beseech you to pursue this research, based on the dual thrill of 1) as a scientist to exert efforts to probing for the truth in natural science and research into, and discovery of, the unknown world and 2) as a military person, to successfully build a powerful military weapon against the enemy

in Harris (1994: 42)

An issue of consequence is that neither he nor his colleagues were especially selected because they proved to have particularly sadistic or callous personalities. They were simply ambitious scientists in search of more challenging tasks:

⁶⁷ Eubios, Journal of Asian and International Bioethics 10 (2000), 179-180

for them, ethics were not an issue. They knew right from wrong. In their minds, however, advanced research was not to be inhibited by ethical restraints. Imbued by a fervent sense of nationalism and a desire to achieve fame and fortune, these men were concerned solely with the final results of their work. They rationalised that the end did justify the means

Harris (1994: 43)

Takashi Tsuchiya⁶⁸ imputes their despicable behaviour to wartime circumstances; to the fascistoid regime ruling Japan at the time; to the threat of being branded as *bikokumin* ("traitors"); to the *kyōken*-system (the academic pecking-order) in which head professors exercised supreme power over their staff. Finally, in such a setting they would have the chance of a lifetime to study diseases that could hardly be found in Japan with a view to the enhancement of their personal prestige and position. Once again we are dealing with ordinary citizens caught up in extraordinary circumstances who fail to live up to basic moral standards.

An alternative explanation is that the practitioners of the biomedical sciences, being imbued with the sense of pursuit of higher, universal goals, are more susceptible to lose the sense of proportion and trade in humanity for somewhat remote objectives, especially when confronting experimentation of human beings dehumanised by fascist rhetoric or by age-old racist prejudices. But this is a conjecture which is only partially born out by the testimony of Major Karasawa Tomio who, during the trials following the Japanese defeat, declared that:

I had thought at that time that the execution of this work would be explained as a duty of a Japanese officer, but now [in retrospect], I shall explain it as a doctor who engages in the benevolent art.

Harris (1994: 43)

Theirs could well be a further instance of Messianic syndrome, the realisation of the boundless power they can exert with impunity and that is justified by the noble mission they took upon themselves. My impression is corroborated by the outrage felt by Sueo Akimoto, a late-drafted young serologist, at the utter indifference displayed by his colleagues with respect to their involvement in the Manchurian atrocities (in Williams & Wallace 1989):

it's astonishing; these people have no shame. Their work in Manchuria had nothing to do with patriotism. It was an elitism that grew like a monster

My impression is that when science is viewed as a value-free enterprise scientists may allow themselves to be morally autistic.

We may now summarize the traits that science in Germany and Japan had in common for the duration of their fascist experience⁶⁹:

- a close alliance of universities, laboratories, big companies, and the state, which is the hallmark of modern science;
- eugenic programmes and human experimentation beyond the pale of a civil society;
- an overarching utilitarian logic paired with nationalism and careerism ;
- a powerful controlling process that enforces a pervasive harmony ideology;
- the annihilation of subjectiveness and individual worth.

Another country whose scientific establishment was partially inspired by German eugenicists and racial hygienists was South Africa. Judging by the contempt in which many Englishmen held the natives of Ireland, Australia, New Zealand, and Canada in imperial times, it is clear that the overwhelmingly disproportionate ratio of black to white people may be expected to play a crucial part in the history of eugenics in South Africa. We do know that after the discovery of the immensely rich South African diamond mines and the subsequent rapid industrialisation and urbanisation of the country it

⁶⁸ Eubios, *Journal of Asian and International Bioethics* 10 (2000), 179-180

⁶⁹ About this broad use of the term "fascism" see Francesco Gatti, *Il fascismo giapponese*, Milano, Franco Angeli Editore, 1983.

became necessary for the two white minority groups, the British and the Afrikaners, to join forces in order better to exploit the extremely cheap African labour. Given the large number of poor whites, mainly low-skilled Afrikaners who had moved into the urban conglomerates looking for decent living standards, a most welcome solution to the white fear of being "swamped" by the black majority was found in the scientific confirmation of what was a widely held belief, that is, that black people were intellectually inferior and therefore unsuited to assimilation or amalgamation (*samesmelting*). The emphasis of racial theorists thus shifted from poor whites to black workers once the grudge that had followed the Boer wars subsided, most likely for merely utilitarian motivations (Rich 1990; Dubow 1992). Before the 1910s that had not been possible. British rulers had grown deeply preoccupied about the prospect of a relentless degeneration of the members of the working classes. 250,000 troops had been deployed in South Africa to quench the Boer rebellion, a number that had clouded the fame of the British Empire and disgraced the new recruits⁷⁰.

Once the successful but humiliating war had come to a close in 1903, W. Taylor, Director-General of the Army Medical Service, sent a memorandum to the Parliament that read:

but the want of physique, thus shown to exist with regard to a large section of the community, is not only serious from its military aspect, it is serious also from its civil standpoint, for if these men are unfit for military service, what are they good for?

Oram (1998: 75)

That this sort of argumentations was entirely subscribed to by British eugenicists and Social Darwinists is unsurprising. Social Darwinism in particular, insomuch as it fulfilled the ruling class's need scientifically to substantiate its social and cultural hegemony – that is that social class mirrored an individual's genetic endowment (Searle in Webster 1981) – was prone to combine the aversion to three different sorts of miscegenation: between humans and apes, whites and blacks, and members of the upper classes and plebs (Breman et al. 1990). Their ideal society would therefore be patently segregationist. Likewise, the eugenic discourse repeatedly stressed its function as a scientific alternative to the Marxist and liberal proposals for a solution to the social question that had arisen with the pauperisation of the urban population in the second half of the nineteenth century (Ambroselli 1994). In the main, eugenicists would not object to capitalism per se, but rather point to the long-term dysgenic effect of the concentration of averagely unfit labourers according to a narrow and myopic perspective of short-term profitability (Searle in Webster 1981). Consequently, social reformers took it in their stride that the lower classes, inadequate as they were to live up to mainstream society's expectations, were to be blamed for those societal ills that plagued their existence (Noll 1995).

In those years in South Africa, as elsewhere, class and racial conflicts merged when "feeble-mindedness" started to be seen as the greatest threat to social stability and to the very survival of the white race. Moral panic broke out when the upper class woke up to the fact that the white poor were likely either to clash with the black workers or, worse still, to join forces with them and start a class war against them that would eventually lead to miscegenation (*rasservermenging*), which was their worst fear (Klausen 1997; Glaser 2001). Subsequently, cultural relativism and scientific racism – that is both cultural and biological essentialist explanations of diversity – conspired to afford South African politicians the opportunity to enact segregationist laws, by giving them an aura of scientific and academic authority (Dubow 1992; Magubane 1996). Additional medical and social concerns about the propagation of "native" diseases occasioned the separation of the indigenous people from the white colonists, a true preliminary test of the feasibility of a solution along the lines of racial segregation and apartheid (Arnold 1988; Maylam 2001). Segregationism was therefore a further instance of where a thoroughly rational and

⁷⁰ Predictably, these preoccupations smoothed the way for that despicable conception of ordinary individuals as dispensable material that particularly characterised the WWI and its overall military strategy on all fronts: *the commanders' lack of faith in their own troops also goes some way to explaining the obsession with attack. The offensive was considered to be easier to conduct because it actively engaged the troops, thereby reducing concerns about discipline. Within the officer corps existed a "suspicion of the reliability of working-class recruits". This was particularly so in the case of the New Army formations which made up the bulk of the attacking force in the Battle of the Somme* (Oram 1998: 84)

modernising response to an emotionally biased understanding of critically important social issues such as industrialisation, miscegenation, social and historical dislocation, may lead:

segregation was not the crude and rigid system that much of the historical literature has presumed...segregation triumphed for the very reason that it was flexible and sophisticated. Mystifying, rationalizing and legitimising a particular configuration of caste and class, it enabled white supremacy to survive in an increasingly threatening world...far from being the crude, irrational prejudice of ignorant "rednecks", segregation must be recognized as one of the most successful political ideologies of the past century. It was, indeed, the highest stage of white supremacy

John Cell (cited by Dubow 1989: 6)

The relative absence of virulent racist discourse was most likely due to both political expedience – it must be borne in mind that whites were and are a minority in South Africa – and to the fact that a racialised outlook of society was so deeply embedded among all South Africans, blacks, Indians and Chinese included, that a major emphasis on the subject was substantially superfluous (Dubow 1989). Correspondingly, the failure of eugenics to catch on in South Africa was possibly due to the existence of a great deal of poor whites who disproved its basic postulate that a race could be individuated, that displayed all the most advantageous characters of the human species (Maylam 2001). Likewise in the United States eugenics was dealt a deadly blow when the 1929 financial crash caused thousands of whites to lose their jobs and security, lapsing to a social status comparable to that of the African-American minority and the immigrants. After the Nazis' defeat eugenics was virtually phased out from the scientific debate in both countries.

Finally, let me briefly refer to the psycho-sexual dimension of the confrontation between black and white people. We have seen that the distinct sexual nature of racism is undisputable. The customary castration accompanying the lynching of Negroes in the former Confederate states, and the parallel hysteria with black men raping white women in times of economic hardness, go to prove precisely that:

sexual fears are not a mere rationalisation of political and economic fears, and white men are genuinely apprehensive of the erotic competition. Thus in the opinion of many historians of race these sexual worries are the ultimate basis of racial antagonism.

Hyam (1990: 204)

For Segrest (Steyn 2001), European explorers, because they were reared in a sexually repressive Christian environment, projected their inhibited sexuality onto the dark, and therefore malevolent and cunning, as well as sexually uninhibited, natives, and afterwards felt morally compelled to subdue and possibly exterminate the polluted Other, as their forefathers did when out witch-hunting. Their paranoid fantasies and anxieties aggrandized the anatomic virtues of the Africans and built a vicious circle of morbid attraction and repulsion caused by an underlying inferiority complex (Steyn 2001). In South Africa these feelings were aggravated by the minority status of the whites who faced the classical dilemma of an ethnic minority, viz. post-diasporic Jews, that is, whether granting individuals freely to choose their partners outside the in-group and in so doing undermining the in-group uniqueness, or sacrificing individual happiness for the sake of group preservation, but in so doing also reinforcing prejudices and external threats (Baumeister & Tice 2001). White South-Africans, afraid of not being up to the blacks' sexual prowess, chose the latter option and science and medicine provided the rationale for carrying out the physical separation of the two groups:

the image of white-coated scientists, professors, doctors, dentists, veterinarians, laboratories, universities, and front companies, propping up apartheid with the support of an extensive international network, was a particularly cynical and chilling one.

from the final report of South Africa's Truth and Reconciliation Commission chaired by Nobel Peace Prize winner Bishop Desmond Tutu (Moreno 2000: 7-8).

3.4 NAZI EUGENICS AND RACIAL HYGIENE

There's even something a bit satisfying, one has to admit, about seeing Hitler in a newsreel with his silly moustache and silly haircut, screaming hysterically and shaking his fist. And one of the reasons we like to see such films or such newsreels is that they give us the reassuring feeling, as we watch them, that we're the sort of people who will recognise it if it ever should approach us. [...] It would be flattering to believe that we are superior in some way to the audiences who cheered for Hitler...but I think it would be more prudent to make the assumption that perhaps we're not. At least we should allow ourselves to imagine that possibility for just a moment...if it should turn out that we are NOT superior, our self-examination might save a lot of people – possibly all people – from being harmed by us.

W. Shawn, *Notes on justification for putting the audience through a different evening*, 1987 (as cited by Holtzman 1989: 223-226)

The Inquisitor violently enforced his creed, because it was unchangeable. The savant enforces it violently because it may change the next day

Gilbert Keith Chesterton (1922: 78)

La réprobation universelle du nazisme fut une immense hypocrisie; l'orientation fondamentale de ce mouvement était d'améliorer indéfiniment l'espèce, de faire le paradis sur terre donc, au moyen de la biologie, du contrôle de la reproduction particulièrement. Ce n'est pas à cette orientation qu'on s'opposait, mais au génocide des Juifs; la stérilisation des criminels et des malades mentaux, de même que le recours à des reproducteurs d'élite seraient sans doute des pratiques encore courantes si elles n'avaient pas été associées dans nos esprits aux camps de concentration et aux fours crématoires

Jacques Dufresne (1986: 9)

In Germany as elsewhere, an epistemological cleavage formed once numerous life scientists disputed the message conveyed by Max Weber in his 1918 lecture on science as a vocation, that people had to resign themselves to the inexorable disenchantment of the world provoked by the scientific inquiry which reduced the ethical and emotional significance of being human to a dull causal mechanism. They instead placed the emphasis upon a holistic, anti-mechanistic, non-atomistic philosophy of the life-sciences (Harrington 1996). Yet, to further confirm that historical and social phenomena cannot be easily classified into discrete parts, and that there is not just a single story to tell about how scientific thought evolved from Enlightenment to post-modernity, we should not make the mistake of presuming that it was among them that social engagement and civic spirit was most abundant. On the contrary, it was reductionist and mechanistic medical scientists such as Emil Du Bois-Reymond and Rudolph Virchow who did most to moralise science⁷¹. While comparisons were drawn between machines and human virtues, and the practice of unconditional objectivity enabled scientists to claim that theirs were exemplary moral standards (Daston & Galison 1992), Rudolph Virchow, an eminent and powerful figure in the German academic world⁷², incarnated the romantic ideal of a medical scientist who takes part in the political life of his country with an eye to the living conditions of the lower classes and a focus as broad as possible (Bauer 1982; Wenig 1995). Throughout his life he held that culture was *die große Feindin des Monopols und Privilegs* [the great adversary of monopoly and privilege], that *ihr Fortschritt der Fortschritt der individuellen Freiheit* [its advance the advance of individual freedom] (Mazzolini 1988: 13), and that physicians, acting as natural attorneys of the poor, should see that every citizen be granted the constitutional right to a healthy existence (Porter & Porter 1988).

He probably developed this intellectual and ethical posture during the 1848 riots in Berlin and from his visits to peasant households in Silesia where he derived a lasting impression of injustice and shame (Otis 1999), for which he faulted Prussian colonialism and the clergy's structural blindness to the need for radical reforms (Mazzolini 1988). A political activist, he founded the German Progressive Party and strove to promote national policies that would realize his scheme of

⁷¹ I suspect this relationship between holistic materialism and civic engagement could turn out to be a fruitful line of inquiry

⁷² and Franz Boas' tutor in physical anthropology (Graves 2001)

a democracy of free and knowledgeable individuals able to take care of their health as thoroughly as they took care of their businesses. Physicians were to become ambassadors of the poor (D. Porter 1999).

Other German colleagues of Virchow such as Salamon Neuman and Max von Pennekofer analogously called for better housing, food, and education for the whole of the population in order to forestall epidemics (Porter, *ibidem*).

Virchow used to maintain that a scientist's duty was to establish the facts and not to philosophise over them (Farrington, 1946); but – and this is a most significant aspect of his thought – he also believed that *die Medizin ist eine soziale Wissenschaft und die Politik ist weiter nichts, als Medizin im Großen* [Medicine is a social science and politics is nothing but medicine on a grand scale] (Labisch 1992: 253). This is an important statement for it reveals that the association of politics and social medicine was by that time accepted even by one of the most prominent German scientists.

In Germany, this “Romantic backlash” (Berlin 1990) went so far so as to promote the doctrine of the *Volksgeist* according to which all expressions of human ingenuity were bound up in the spirit of a people and its traditions (Gasman 1971). Immersing oneself in the essence of a *Gemeinschaft* could help attain its comprehension. This view was enlarged by scientists such as Ernst Haeckel, a German marine biologist whose international bestseller, “*Die Welträtzel*” (literally, “the World Riddle”), sold half a million copies in Germany alone, being translated into 25 languages (Shipman 1994). This was a book that, claiming that its author could solve all the remaining scientific riddles, offered a modern religious faith (Gasman 1971). But this only to uncritical minds, for most German intellectuals felt ashamed of such a conceit. The Berlin philosopher Friedrich Paulsen mounted a withering attack on both the author and the state of education in Germany:

Ich habe mit brennender Scham dieses Buch gelesen, mit Scham über den Stand der allgemeinen Bildung und der philosophischen Bildung unseres Volkes. Daß ein solches Buch möglich war; dass es geschrieben, gedruckt, gekauft, gelesen, bewundert, geglaubt werden konnte bei dem Volke, das einen Kant, einen Goethe, einen Schopenhauer besitzt, das ist schmerzlich

[I have read this book with a keen sense of shame, of shame at the state of the general and philosophical education of our people. That such a book has been possible, that it could be written, printed, bought, read, admired, believed by the same people that owned a Kant, a Goethe, a Schopenhauer, that is painful]

Cited by Hermann (1982: 78)

Physicist O.D. Chwolson's comment was (*ibidem*: 79):

Welche Gefühle müssen wohl diese Zeilen...bei dem Kenner der Physik auslösen? Verachtung oder Erbitterung? Was soll er tun – lachen oder weinen?

[What feelings should these lines arouse in an expert of physics? Contempt or bitterness? What should one do? Should he laugh or weep?]

In the light of these criticisms it may seem extraordinary that only a few scientists eventually stood up when it came to defend science from Nazi blandishments. And yet that same anti-reductionist stance that charged positivist mechanism with dehumanising society ended up endorsing that extreme form of biological determinism that fostered the conception of National Socialism as *angewandte Biologie*, i.e. applied biology, as claimed by Hans Schemm, a member of the Bavarian government from 1933 to 1937 (Labisch 1992; Lerner 1992; Harrington 1996). Adolf Hitler himself stated that (Vogt 1997: 288):

So ist unsere Revolution ein weiterer Schritt oder vielmehr der endgültige Schritt zur Überwindung des Historicismus und zur Anerkennung rein biologischer Werte

[our revolution is another step, or rather the final step towards the overcoming of historicism, and the acceptance of pure biological values]

From the Nazi perspective, historicism and mechanistic/materialistic science were peculiarly “Jewish” and undermined the “healthy” organic conception of Germany as one *Volke* with one *Führer*, in which a prominent role would be

assigned to biologists and geneticists, now responsible for the popularisation of the fundamental laws of life supposedly sustaining the régime (Harrington 1996). German biologist Bernhard Dürcken remarked that at the core of the Nazi revolution in biology and society lay the notion of wholeness (Harrington 1986). Holism accelerated the drift towards the final solution by reinforcing the idea that the whole took precedence over its parts, and in so doing it frayed the web of collective solidarity towards the weak and the mentally retarded. Additionally, the existence of disabled people depended upon an artificial environment, precisely the sort of environment most averse to a holistically minded bio-scientist. Not being in the service of life, the disabled and feeble-minded were actually disposable machines. Nazi physician Karl Köttschau was very outspoken on this point (Harrington 1996: 186):

our time does not need externally controlled machine-people, but rather self-controlled people who have developed their own powers schooled in battles with a healthy Nature. Our time needs the heroic man, the man who is up to the challenges of the time, and who does not have to rely on the doubtful protection of an all too artificial environment

Ironically, though, Hermand Jost (Jost 1992) has given evidence of the technocratic character of much Volkish utopian literature, in which German engineers are confided the task of redeeming the Fatherland, even though its exponents despised Weimar's technocratic administration of German society. By the same token, Volkish themes (*folkhem*) also surfaced simultaneously in post-WWI Sweden as the triumph of a "mystique of the engineer", namely, the identification of national prestige with technological innovation and productiveness (Colla 2000). Once again, let me stress that these apparently antagonistic modes of thinking, technocratic scientism and populist romanticism, that deeply affected the way science was being done were really inseparable and complementary. The one could not exist without the other.

The much-despised separation of man and nature could be overcome by "life-sustaining myths" that met with the approval of the most respected European intellectuals (Clark 1993). The price to pay for the preservation of primeval virtues and mores was to be exceedingly high: as ethics answered to the needs of natural selection – a fact that was inescapable for Haeckel, for instance –, free will, human dignity, and individual autonomy would be sacrificed to higher priorities and natural calls (Stein 1988). This is a point that cannot possibly be overstated. In its rush to modernization, Weimar culture certainly retained atavistic traits and caused an anti-modernist backlash but this, as correctly stressed by Detlev Peukert (in Childers & Caplan 1993) and Paul Weindling (1989b), was not in the least a uniquely German occurrence. Harwood (1996) hits the nail on the head when he states that, as contradiction and conflict are inherent to modernity, it comes as no surprise that Weimar intellectual life turned into a "patchwork quilt" of holism, vitalism and mechanistic materialism. Physicians went along with the regime in order to profit from the new political and social framework (Sereny 1974; Götz et al. 1994; Szöllösi-Janze 2001; Paul 1995; Mildt 1996; Müller-Hill 1988), but they also had solid reasons of an ethical and methodological kind to validate their choices. On the other hand, bio-policy became the much-sought after surrogate for the Christian ethics, that was by many seen as outmoded and too conventional (Stein 1988).

The two persons who most clearly foresaw what would happen in Germany, should the dreams of racial hygienists and eugenicists come true, were one of Ernst Haeckel's most famous students, Oscar Hertwig and Haeckel's lecturer, Rudolf Virchow. Hertwig (in Vogt 1997: 277) warned that

Ein Menschengzüchter müsste übermenschliche Voraussicht besitzen. Gerade sittlich und geistig hochstehende Menschen sind sich ihrer Schwächen bewusst und würden sich nicht für ein solches Tribunal melden, wie sich früher gewiß nicht die Besten zum Amt des Großinquisitors drängen

[A breeder of people should possess a supermanly foresight. But it is precisely those persons who are ethically and spiritually superior that are conscious of their weaknesses, and would not volunteer for such a tribunal, much the same as earlier on it was certainly not the best people who pressed for the office of Grand Inquisitor]

Virchow analogously admonished Haeckel that his attempt to replace the Church's dogmas with a religion of evolution would come to grief (Gasman 1971). Haeckel, who did lay down the foundations of that belief in biological

determinism that smoothed the way for National Socialism, did not live long enough to see the implementation in the political and social spheres of what he preached.

While it is true that the essence of German National Socialism was the merger of biological determinism and politics (Labisch 1992; Lerner 1992), a further fundamental aspect of National-Socialist Germany was the belief that the nation was ill, and National Socialism was the cure. Now this was not just trite propaganda. Thousands of people in Germany truly believed that, and complied with the régime's doctrine of "applied biology". One of my contentions is that the basic ideological discrepancy between Nazi Germany and fascist Italy is epitomised by the fact that Hitler presented himself as a biologist and a surgeon, while Mussolini claimed to be a doctor. We will return to Mussolini's claims in the next section.

No doubt happy to adopt the perspective that *calling for surgical methods always shows less faith in the patient's constitution and more in the skills of the surgeon* (Midgley 1985: 68), Hitler applied extreme eugenic measures, whereas fascism privileged eugenics, or social hygiene. This is probably the reason why most of the leading German bio-scientists agreed with Nazi political initiatives, forming a sort of symbiotic relationship with them, one of mutual reinforcement and reciprocal legitimisation that produced some of the most outrageous laws ever approved (Proctor in Harding 1993).

[The eugenicists] sahen ihren Traum, die Umsetzung der Eugenik in praktische Politik und die Etablierung der Rassenhygiene als Leitwissenschaft, wahr werden. Ihre Expertise stand von einem Tag auf den anderen im Mittelpunkt staatlichen Handelns.

[They saw that their dream of an implementation of eugenics in the praxis of politics was coming true. All of a sudden their expertise became central to crucial political issues]

Stefan Kühl (1997: 123)

In fact, not a single non-Jewish scientist numbers among German dissidents (Haberer in Cerruti & Fazio 1976) and German racist scientists were never boycotted by the international scientific community (Weingart in Aant et al. 1990)

As we have seen, much of the background to eugenic measures was built up prior to 1933, on occasion of the industrial crises that afflicted the already wobbling Weimar democracy (Roth 1984). At that point Weimar biology and anthropology consorted with each other and prepared the ground for the NS Machtergreifung (Labisch 1992). So it was that in Weimar Germany courses of eugenics were established as early as 1922 (Glass, 1997). This resort to genetic data was obviously necessary to scholars who had to base their racial hypotheses on "firm ground", but it led them to view individuals in terms of typologies and to anchor moral values to biological hypothetical laws (Makowski 1996).

The evidence accumulated by scores of scholars points to a progressive shift of emphasis on the part of the German élite towards a moral worldview that regarded social inequality as an inbuilt characteristic of human nature, a persuasion that was tapped into by the Nazis to shore up their power and legitimise their discriminatory policies (Weindling 1989; Propping in Propping-Shott, 1992; Friedlander 1995). The underlying rationale was eminently utilitarian and efficiency-bound, and left no room for traditional values such as solidarity and compassion, either in bio-medical science or in society at large, in a mutually reinforcing process that paved the way to the Holocaust (Glass 1997). The result was the general reliance of politicians on medical diagnoses of social problems and the suppression of the individual rights for the sake of the collective good (Usborne 1992). This is equivalent to what we now call the "medicalisation of society", or "social sanitation", and it is grounded on the adaptation to universal laws of nature, such as natural selection and genetic inheritance, that by necessity apply to the moral domain as well. This phenomenon was not confined to Germany alone, though. Eugenics attacked the mainstays of capitalism and nationalism, by labelling the social policies they inspired as dysgenic. Its theories pointed out that that a eugenic utopia could be fashioned, in which class divisions would be overcome once and for all (D. Porter 1999).

These ideas were remarkably progressive for that time, as I shall argue, and their upholders found themselves perennially under the threat of being charged with subversive intent.

In view of Weindling's analysis (Weindling 1987, 1988, 1989a, 1989b), I venture to contend that what ushered in the sea-change from an anti-establishment attitude to a repressive doctrine was the immoderate nationalistic urge that grew more and more virulent after Germany's smarting defeat in WWI. Indeed, the National Socialists' astonishing success in blending mystical and scientific undercurrents with some of Weimar's most progressive social policies was achieved by capitalising on the sincere commitment of German life-scientists and biological anthropologists to the foundation of a genuinely German civic religion, one that was to challenge both the Judaeo-Christian dogma of the discontinuity of the "Ego" with the universe and the Enlightenment principles of equality and justice sanctioned by the American and French revolutions:

Die aus der Evolutions- und Selektionstheorie gewonnen "Ethiken" eugenischen Verhaltens richten sich explizit gegen die christliche Individualethik und den Gleichheitsgrundsatz der Aufklärung

[The ethics derived from the theory of evolution and selection are explicitly directed against the Christian ethics of the individual subject and the enlightenment's principle of equality]

Weingart, Kroll, Bayertz (1988: 18)

Even cancer-research was not immune from this blend of utilitarianism and liturgical mysticism that was Nazism (Pois 1986; Conte & Essner 1995).

Beginning with the Sixties, specific evidence has been sifted which demonstrates that National Socialism was also a project of technocratic modernisation of German society through scientific means (Dörner in Thom & Mitja Rapoport 1989; Renneberg & Walker 1994) engaging all those disciplines that proved to be useful to the furtherance of the Nazi plans and, in the main, allowing scientists to preserve a rational and results-oriented attitude (Walter Hirsch 1961; Szöllosi-Janze 2001). Some scientific methods adapted well to NS, other less so. The strictly quantitative methods, for instance, were extremely serviceable to the regime, whereas more individually oriented ones were deemed useless (Götz in K.U.Z. 1988). Aside from its pursuit of military excellence, National Socialism also produced cutting-edge scientific research on cancer prevention that had no parallels until the 1960s (Proctor 1996, 1999). The regime promoted biodynamic farming, concern about pesticide use, vegetarianism, antivivisectionism, the regulation of the use of pesticides, asbestos and food dyes (Proctor, *ibidem*).⁷³ German chemist Otto Hahn once mockingly told a Canadian interviewer that Adolf Hitler was (Hermann 1982: 129)

in seiner Lebensführung fast ein Heiliger. Kein Alkohol, nicht einmal Tabak, kein Fleisch, keine Freundinnen. In einem Wort: Hitler ist ein eindentiger Christ

[almost a saint in his life conduct. No alcohol, never tobacco, no meat, no girlfriends. In a word: Hitler is no doubt a Christ]

Nazi policy-makers grew pedantic in their striving to act up to their beliefs, but there was much more to that than mere pragmatism. The reason for this seemingly progressive attitude most likely was an almost pathological obsession with health and purity on the part of the Nazi leaders, the same which led to the extermination of the "parasites" in the German body (Proctor 1996; 1999). The Reich's scientific programmes were mainly intended as a response to the massive demand of both social and corporal cleanliness that had been stimulated by the Nazi establishment itself. In other words, Proctor has detected a common denominator for both the anti-tobacco program (pertaining to the domain of bodily purity) and the extermination of the *Untermenschen* (concerning the domain of racial hygiene, i.e. the body politics and Germany's "social

⁷³ Incidentally, Göring's laws for the protection of wildlife still obtain (Arluke & Sax in Birke & Hubbard 1995).

body”), that is to say, a “homeopathic paranoia”.⁷⁴ In a way, Nazism was less “applied biology” – in fact, a paraphrase of Bebel’s definition of socialism as applied science – than “intensive therapy” of a seriously diseased patient. Lifton envisions the Nazi state as a biocracy, that is, a theocracy ruled in accordance with pseudo-biological doctrines. Economic crisis, financial bankruptcy, and social malaise were attributed to pathologies that could be cured with desperate remedies. Such was the strength of the metaphor of the “hygienic state” going hand in hand with the transfiguration of Hitler as the “Robert Koch of politics” (Koch was, of course, the father of bacteriology).

Likewise, Nazi support for genetic research was inspired by ideological as well as utilitarian considerations for, in the rhetoric of the German geneticists of the time, the genetic doctor (*Erbarzt*) could create a “healthy and resistant combination” instead of helplessly watching defective human beings pass away as traditional doctors did (Deichmann and Müller-Hill in Renneberg & Walker 1994). The revolutionary character of this doctrine with respect to the solution of the social question is undeniable. Never before had a government so adamantly sought to transform into medical and biological issues problems that up until then had been imputed to social and historical circumstances (Kolloquien 1988; Thom & Rapoport 1989). But then again this is precisely the origin of its malign appeal to the masses and to scientists alike. And not in Germany alone. Let me remind the readers that American scientific journals fully reported the development of eugenics in Nazi Germany, but this did not spark any public outcry (Seidelman 1989).

The Nazi regime did condition basic research in all those disciplines that were not immediately relevant to their war-effort and racial policies: biology, medicine, anthropology, genetics were boosted while others languished (Proctor 1988). Bankrolling a branch of science to the detriment of others is indeed a most efficacious means to distort the scientific ethos without directly indoctrinating a single scientist. As contended by Ute Deichmann (Deichmann 1996), biological research thrived in the Third Reich’s period⁷⁵ and the majority of grants were not given to openly ideological projects or to members of the Nazi party. In the last analysis the whole process of state-funded scientific inquiry carried on almost as normal, despite the dismissal and imprisonment of political opponents and Jews from their ranks. German scientists’ commitment to a “pure science” unbiased by any political convictions was a convenient stand, more than a noble pursuit, and it sheds light on the intrinsic immorality of a solely utilitarian perspective in which the individual’s worth is assessed on the basis of economic considerations, that is, cost-benefit analysis in a condition of scarcity of resources.

With the outbreak of hostilities, things took a ghastly turn and researchers with a training in human genetics collaborated with the regime in disproving the claims of those half-Jews who sought to escape death by pretending that their legal father was not their natural father (Müller-Hill 1993). This seems all but inexplicable when we peruse the oral reports of German doctors trained during the Third Reich, which show that the teaching of *Rassenkunde* and *Erblehre* was far from being taken seriously by many students (Kudlien 1990). Yet none stood up, and millions of people were murdered, because of the absence of public questioning of the scientific foundations of those disciplines.

In a nutshell, the Third Reich was a scientific enterprise (Gasman 1971), not its obverse, and that could account for the absence of dissent among scientists that, on the contrary, especially amidst physicians, joined the Party, and even the Waffen-SS, enthusiastically: by 1936, 42 percent of all physicians in the 31-40 age-group were members of the Nazi Party (Glass 1997). Incidentally, this is just as true for Japan (Homei)⁷⁶. Science simply concurred in the shaping of the very concept of German nation and German Volk. A pervasive Darwinian worldview together with a Romantic undertone on

⁷⁴ Mary Douglas

⁷⁵ Robert N. Proctor (in Bayertz 1998, p. 36) observes that the 1937 official handbook of the Hitler Youth included a long chapter on Darwin’s principle of natural selection, August Weismann’s principle of the „immutability of the germ plasm“, and Mendel’s laws of genetics

⁷⁶ In the case of Japan, an important line of inquiry could be the investigation of the motivations that kept Japanese geneticists from advocating eugenics (Homei 2000).

the part of many leading scientists – viz. Haeckel (Gasman 1971) – conspired to bring about the convergence between science's and the nation's destinies.

Paul Weindling (1989) has realized a thorough analysis of this process of scientization of German politics and society, between the unification and the Nazi era, that might help us figure out the mechanisms at work in such a development. He maintains that, already during the nineteenth century, scientists had managed to acquire a leading role in matters of social policy and lifestyle, while simultaneously their disciplines grew ever more distant from the comprehension of ordinary citizens, although a mass-market for scientific popularization was forming. The dominant trends in German science were essentially two: 1. a tendency to professionalization and specialization leading to the constitution of a technocratic elite, and 2. one more democratic and liberal in both its aims and means. Both trends combined to give shape to a prevalent view of scientific activities as the chief means to effect those drastic social changes that were called for to solve the multitude of problems provoked by industrialization, urban migration, gentrification and population increase. In other words, in a country ruled by a leadership that was strongly adverse to the socialist movement with its claims that the status quo was mainly responsible for most social ills, a scientific alternative could not but be welcome. The popularity of science as a true panacea for the German malaise went hand in hand with the dismissal of all clerical pretence to call the tune with regard to social policies and individual self-determination: *scientists were high priests of nature able to determine guidelines for a human society* (Weindling 1989: 37).

Those few biologists and geneticists who abstained from getting involved in politics found it very difficult to get the message through to public opinion that genetics was applicable to man solely in principle, but that much more work had to be done before it could turn out as feasible enterprise. People frustrated by the economic crisis and by the bleak prospects would not listen (Graham 1977).

Having said that, let me reiterate that German eugenics was *rooted not in fringe, lunatic science but in the mainstream of reputable genetics in what was indisputable the most advanced scientific and technological society of its day* (Caplan in Sloan, 2000: 209), and that *the hereditary biologists were at the research front of their time* (Peter Weingart in Mendelsohn & Nowotny 1984). It is fair to say that eugenics, racial hygiene and genetics at their inception could not be conceived as distinct fields (Makowski 1996).

In the end, as remarked by Benno Müller-Hill (in Bayertz 1998), German biologists knew what they were doing, they were wholly aware that the phenotype was only partially determined by the genotype, but they resolved to deem the fate of their country more important than that of the individual patient and ignored the countervailing evidence. As a result, the majority of doctors interviewed by Lifton approved of the sterilization laws: they believed the laws to be consistent with prevailing medical and genetic knowledge concerning the prevention of hereditary defects, though a few doctors had some hesitation about the laws' compulsory features (Lifton, *ibidem*, 29). A widely employed manual written by Rudolf Ramm maintained that doctors had no longer to confine themselves to care-taking but were to become "cultivators of genes" (*ibidem*, 30). More people were convinced that genetic inheritance constituted an irreversible process of deterioration of the social fabric. The result was a conspicuous absence of moral inhibition. Ultimately, what we now regard as aberrant was partly based on reasonable scientific deductions deriving from the knowledge available to scientists of that time (Bronberg, Roll-Hensen, 1996).

This conclusion has a major impact on the question of the social impact of the Genome Project. Modern scientists are not an altogether different sort of professional from their German colleagues implicated in the Nazi atrocities. As the former are not sociopaths or criminals, so the latter were not suspected of harbouring any homicidal instinct – and justifiably, as they were by no means murderers and once they became West German citizens, they proved to be law-abiding. Formerly, they rather displayed a self-serving conception of the scientific pursuit, as may be seen in Fischer's statement (quoted in Labisch 1992: 190) that:

Es ist ein besonderes und seltenes Glück für eine an sich theoretische Forschung, wenn sie in eine Zeit fällt, wo die allgemeine Weltanschauung ihr anerkennend entgegenkommt, ja, wo sogar ihre praktischen Ergebnisse sofort als Unterlage staatlicher Maßnahmen willkommen sind

[It is a rare and special good fortune for a theoretical science to flourish at a time when the prevailing ideology welcomes it, and its findings can immediately serve the policy of the state]⁷⁷

The pity is that Benno Müller-Hill is probably correct when he states that the Nazi establishment would not have had such a strong hold on the public opinion without the endorsement of the scientific and intellectual elite (forward to Lerner 1992 51).

⁷⁷ Müller-Hill's translation (1988)

3.5 FASCIST EUGENICS AND EUTHENICS

La questione demografica (e poi eugenetica) non è quindi un aspetto accessorio o marginale della concezione e della politica mussoliniana: ne è, al contrario, un aspetto centrale

["The demographic (and also eugenic) question is no accessory or marginal to Mussolini's conception and politics: it constitutes, on the contrary, its core"]

Giorgio Israel and Pietro Nastasi (1998: 116)

Of course there are no pure races left; not even the Jews have kept their blood unmingled...Race! It is a feeling, not a reality; ninety five per cent, at least, is a feeling. Nothing will ever make me believe that biologically pure races can be shown to exist today...No such doctrine will ever find wide acceptance here in Italy...National pride has no need of the delirium of race

Benito Mussolini (Bernardini 1977: 439)

Primo Levi, a survivor from Auschwitz and a foremost writer on that experience and of the war as a whole, in "Il sistema periodico" (1975: 66), expresses his view of how very many Italians managed to play along with fascism, and simultaneously guard their independence of judgment, by describing a lieutenant:

One could easily notice that he wore that uniform with loathing (...). He spoke of fascism and war with reticence and with a sinister gaiety that I did not have difficulty to interpret. That was the ironic gaiety of an entire generation of Italians, intelligent and honest enough to reject fascism, too sceptical to oppose it actively, too young to passively accept the looming tragedy and to give up their hopes for the future; a generation to which I myself would have belonged, if it hadn't been for the racial laws which precociously matured me and guided me in my choice.

What were the reasons behind the refusal on the part of Italian officials to carry out Mussolini's order to take prisoners all Jews living in the Italian-controlled areas. As a rule, besides the usual and this time most welcome Italian disorganization, the motivation normally adduced is that such an order was incompatible with the honour of the Italian army (Hiden 1991); but there remains the question of why two nations plagued by totalitarianism and disgraceful racist campaigns "inhabited different moral universes" (J. Steinberg in Hiden 1991: 59). I believe this gap can be partly illuminated by pointing to the way the Italian bio-medical profession dealt with the clash between the dominant Catholic morality and Mussolini's appalling decision to indulge his ally, Adolf Hitler.

Applicheremo i rimedi più drastici anche al paziente più ribelle ["We shall apply the most extreme measures even to the most unruly patient"], Mussolini once said (Cosmacini, 1989: 147), presenting himself as the doctor of the nation, one that in order to "cure" the Italian "race" was prepared to *inject the most toxic poison into the blood of Italians*, the poison being racism and anti-Semitism (Cosmacini, ibidem: 166). Mussolini would therefore remove from circulations dangerous individuals just as doctors would remove contagions (Horn 1994). These statements best encapsulate the difference in leadership style between Mussolini and Hitler, the former conceiving the art of government in social-medical terms (Horn 1994), the latter understanding it as a socio-biological task (Kühl 1997). As a consequence the decision to exterminate the Jews was a natural development of NS politics in Germany, as opposed to Italy, where it was largely opposed even within the party ranks.

The conventional view of the relationship between science and racism in pre-1938 Italy has always been as unconvincing as it is hard to pull apart. It goes like this. Before Benito Mussolini made the decision to toady up to Adolf Hitler and enact racial administrative and juridical measures against Coloureds and Jews, Italy was virtually free from racist slants, but afterwards those scientists who complied with Mussolini's instructions did so out of mere opportunism and careerism. However, the amount of evidence that has been gathered over the past years reveals a rather different, multi-

faceted, and dismaying picture, one in which Italian scientists, far from matching the official image of sensibility, tolerance, and moral integrity, are in many cases portrayed as precursors if not inspirers of the fascist racial laws.

That Italian-style eugenics was a far cry from that pursued by several Protestant countries is still out of question. Notably, the president of the Italian association of hygiene, Achille Sclavo, admonished his colleagues not to pursue the dangerous and delusive path of "human zootechnics" because the human population is not cattle. This view was endorsed by Corrado Gini, the president of the Italian society of genetics and eugenics (SIGE), who was to become personally involved in the drafting of the racial laws, but earlier on had argued that it would be impossible to tell the most fit from the less fit (Pogliano 1984). This was likely due less to strong personal convictions than out of compliance with the official political and religious course laid by the government and by the Vatican, two institutions that were keenly pro-natalist and anti-malthusian. The medical and biological professionals remained wary of all attempts to introduce in Italy social Darwinism and Weismannian-Mendelian genetic determinism⁷⁸, uniquely apposite to support those harsh negative eugenic measures (Schneider in Adams 1990) deemed necessary for the evolutionary betterment of human population (Vogt 1997). As a rule, Latin biologists refused this stance on both moral and scientific grounds, and rather opted for the improvement of puericulture, clinical treatment, statistical surveys and classifying, and the divulgation of basic information on prophylactic social hygiene (Gianferrari 1945; Maiocchi 1999). In so doing they confirmed that ideological and moral tenets heavily condition the way scientists look at data.

Un'ortodossia s'impone, la quale richiedeva rituali anatemi contro le "aberrazioni" della pseudoscienza anglosassone

[An orthodoxy prevailed, which called for ritual anathemas against the "aberrations" of Anglo-Saxon pseudo-science]

Claudio Pogliano 1984 (82)

This phenomenon was not limited to Italy. In Germany and Anglo-Saxon countries it was life-scientists who headed the eugenic movement, as opposed to Italy, France, Spain, and Latin America where the influence of clinicians and pediatricians predominated (Adams 1990; Drouard 1992; Léonard 1992; Pauly 1993; Ambroselli 1994; Beltrão Marques 1994; Schneider 1994; Carol 1995; González & Peláez 1999; Glick, Puig-Samper, Ruiz 1999; Persell 1999; Cleminson 2000). The choice made by Italian professionals and fascist authorities was quite reasonable on another count, that is to say that Italy was, they thought, extraordinarily heterogeneous, and a racial transformation could not possibly rely on deterministic laws. As in Japan (Frühstück 1998; Homei 2000), the establishment felt the need to improve the "stock" as rapidly as possible in order to compete with the hegemonic nations and this could only be achieved through a "*dynamic theory, rather than static, of race and heredity...[that allows for the] elevation of relatively inferior races through various cycles of heredity*" (Mussolini, as quoted by Gillette, 2002: 54).

It is noteworthy that, as in Germany, the earlier liberal governments had already planned most of the health policies brought into effect in a much harsher form by fascism, thanks to the pressure of progressive doctors who tended to conflate politics, environmental prophylaxis and divulgation of basic notions of hygiene amidst the population (Widmann 2001). Fascism amplified an already established economic and biological view of life, health, and illness, and promoted hygiene as a cultural habit (*habitus*) together with the idea of the inheritability of deviant behaviour (Widmann 2001). Seldom were suggestions advanced that measures such as pre-emptive sterilization, eugenic abortion, birth-control, or certificates of marriage eligibility after passing the premarital examinations, could find suitable application in Italy as well, nor did the popular predilection for meliorism, intended as a set of interventions in the social environment, ever give way to

⁷⁸ The Lamarckian paradigm that postulated that genetic traits could be acquired and passed on through inheritance was challenged and disproved at the end of the 19th century by August Weismann, who proved with almost absolute certainty – there should not be room for absolute certainty in science – that a change in phenotypic characters (body tissues) would not affect reproductive (genotypic) characters.

instances of genetically-oriented negative or positive eugenics (Maiocchi 1999). In a nutshell, neither medicalised control nor Galtonianism became truly popular in fascist Italy.

There seems to have been a certain measure of awareness, even among the fascist advocates of political medicine, that, in the words of Rinaldo Pellegrini⁷⁹ *le società umane sono troppo complesse, e almeno in parte irrazionali, per essere trattate con i soli concetti della medicina* ["human societies are too complex and partly irrational, to be treated by means of medical concepts alone"]. On the other hand, it is important to reiterate that it was probably just a matter of circumstances that impeded Italian eugenics from developing its potentially pernicious aspects. Thus, for instance the Neapolitan eugenicist Leonardo Bianchi remarked that *Il nostro paese è troppo sentimentale, ed io partecipo alla ripugnanza dei più per un intervento chirurgico* ["Our country is too sentimental, and I myself share the common revulsion at the idea of a surgical intervention"] (Maiocchi 1999: 24) and the psychiatrist and anthropologist Enrico Morselli referred to sterilization as a beneficial practice but also observed that

Soltanto una lunghissima evoluzione dei costumi e dei sentimenti dei popoli civili potrà renderne meno ostica e repulsiva l'idea e farne riconoscere la relativa opportunità pratica nella estensione necessaria per un completo programma eugenetico

[Only a very long evolution of customs and sentiments of civilised people could render less unpleasant and repulsive the idea [of systematic sterilization] and show its relative practical expediency to the extent necessary for a complete eugenic programme].

However, *Realpolitik* eventually gained the upper hand over scientific rigor and several Italian biologists, anthropologists, demographers, and statisticians did not refrain from arranging populations according to a racial hierarchy, in spite of the unlikelihood that any theory could ever make sense of the somatic variability of Italians in terms of biological homogeneity and superiority. A solution was found that employed the notions of *etnia* (ethnic group) and *stirpe* (stock, *Sippe* in German), instead of race – the Italians had been conceived of as a spiritual, or historical, race⁸⁰, – but substantially retained most of the unpleasant features of much non-Latin eugenics, such as a drive to domination over the inferior races (those inhabiting the Italian colonies), a creeping anti-Semitism and the prohibition to marry a member of an inferior race. All this added up to an obsession with racial purity (Israel & Nastasi 1998). It was not a matter of annihilation of the inferior by the superior, but of the necessity to secure the predomination of the latter over the former. Alas! many Italian scientists co-operated with the regime in the implementation of its colonial and segregationist plans, with studies ranging from topics such as the effectiveness of the Mediterranean diet for the enhancement of the *stirpe* and as a contribution to food-autarchy (Israel, Nastasi 1998), to the statistical-demographic demonstration of the senescence of the French and British nations.

I have previously laid out my hypothesis that utilitarianism goes a long way to explain the success of the eugenics pursuit. Italy was no exception. For instance, in 1922 neurologist Ettore Levi founded the *Istituto d'Igiene, Previdenza ed Assistenza Sociale*, designed to devise all the appropriate means to successfully fight all sorts of "social diseases". Its exponents and promoters – one of them was Benedetto Croce – were neither particularly conservative nor overly innovative. However their moderate background did not prevent them from taking a rather perilous tack. In fact, the institute's official bulletin featured an editorial that went like this:

Nessuna conquista, sia nel campo spirituale che in quello politico ed economico, è infatti concepibile se prima non si modificano le cause che diminuiscono le possibilità produttive della mirabile macchina-uomo fonte unica e prima di ogni progresso civile

[No achievement, in the spiritual, political, as well as in the economic realm, is conceivable without altering those factors that reduce the productivity of that admirable man-machine that is the primary source of all civil progress]

Maiocchi (1999: 15)

⁷⁹ Co-director of the "Archivio fascista di medicina politica" (Maiocchi 1999: 39)

⁸⁰ Gillette (2002) points out that biological racism would be taken up only by a tiny minority of Italian scientists who were much more inclined to spiritual racism.

Human life was more and more regarded as a marketable good. So much so that Pietro Capasso contended that as Italy was poor in raw materials, it ought to count on human resources and therefore had a duty to protect them and select them so as to maximize its efficiency and financial return (Pogliano 1984). Much to the doctors' delight, medicine was mobilised to rebuild the Italian population and fulfil Mussolini's imperial dreams. Subsequently, medicine extended its confines and prerogatives to include economic, juridical, moral, social, and political functions. Benito Mussolini in 1931 addressed the Italian doctors with extremely flattering words:

Voi potete andare casa per casa e correggere tutte queste debolezze inevitabili dello spirito umano [...]. Io sono profondamente convinto che il nostro modo di mangiare, di vestire, di lavorare e di dormire, tutto il complesso delle nostre abitudini quotidiane, deve essere riformato. [...] I medici devono insistere perché la vita si svolga in forma più razionale.

[You go from household to household and straighten out all these inevitable weaknesses of the human spirit. [...] I am deeply convinced that our way of eating, dressing, working and sleeping, the whole of our everyday habits, must be reformed. [...] Doctors must insist that life be lived in a more rational form]

Pogliano (1984: 86-87)

Biologists and doctors alike were enjoined to support the State, which claimed for itself functions that had formerly been the prerogative of heads of family, district and country doctors, and curates (Pogliano 1984). Once again, we see the paradigmatic shift from the individual concern for one's health to the rational government of collective health. That doctors devotedly pursued this hygienic utopia provides further evidence of their tendency to suffer from a combination of professional ambition and idealistic delusions that would lead them to a missionary commitment to the enactment of illiberal policies. Life, health and death become commodified in liberal and totalitarian countries alike (Bonetta 1990). The difference is in scale and in the means of enforcement.

With the advent of fascism, these objectives took on a different flavour, one altogether compatible with the exigencies of a totalitarian regime. "Reasons of State" finally prevailed over more ethical concerns, so that the report presented by Ettore Marchiafava on the occasion of the constitution of the ONMI, the *Opera Nazionale Maternità ed Infanzia* (National Agency for Maternity and Infancy) read as follows (Maiocchi 1999: 30):

La protezione, l'assistenza della maternità e dell'infanzia non è soltanto un dovere della solidarietà umana, della carità reciproca, confortato nei credenti dal sentimento religioso [...] ma anche un alto dovere sociale, il cui adempimento deve essere diretto e vigilato dallo Stato, perché dalla efficacia delle opere, volte al bene della maternità e dell'infanzia, dipendono il succedersi di generazioni sane e forti, il miglioramento della razza, la efficienza, la prosperità materiale, intellettuale e morale, l'onore e la dignità della nazione

[The protection and care of motherhood and childhood is not merely a duty of human solidarity, mutual charity, reinforced among the believers by their religious sentiment [...] but also a high social duty, whose fulfilment must be directed and watched over by the State, because on the effectiveness of deeds concerned about the good of maternity and infancy depend the future of strong and healthy generations, the betterment of the race, the efficiency, the material, intellectual and moral prosperity, and the honour and dignity of the nation]

Roberto Roberti in 1929 thus commented on the obligation of citizens to serve the State:

From the principle...that work is a social duty, and that the development of production is an essential element of the life and progress of the Nation, derives the consequence that the bodily integrity, health, and physical resistance of the worker constitute a "good" that must be protected, not only and not principally for individual ends, but for the ends of the superior interest of the Nation.

Horn (1994: 41)

Eventually, Benito Mussolini came to the conclusion that Italy had to take its cue from Germany, and therefore needed a "Manifesto of the racist scientists" which was then made public on July 14th 1938 and comprised ten theses that I summarise as follows:

1. Human races exist. The existence of the human races is no longer an abstraction of our spirit, but corresponds to a reality that is material and perceptible with our senses.
2. There exist large races and small races.

3. The concept of race is a purely biological concept. It is therefore based on other considerations than the concepts of a people and of a nation, founded essentially on historic, linguistic, and religious considerations.
4. The majority of the population of contemporary Italy is Aryan in origin and its civilization is Aryan. This population with its Aryan civilization has lived for several millennia in our peninsula; very little remains of the civilization of the pre-Aryan civilization.
5. The influx of huge masses of men in historical times is a legend.
6. There exists by now a pure "Italian race",
7. It is time that the Italians proclaim themselves frankly racist. [...]. The conception of racism in Italy ought to be essentially Italian and its direction Aryan-Nordic. [...]...this means to elevate the Italian to an ideal of superior self-consciousness and of greater responsibility.
8. It is necessary to make a clear distinction between the European (Western) Mediterraneans on one side and the Eastern [Mediterraneans] and the Africans on the other.
9. Jews do not belong to the Italian race. Of the Semites who in the course of centuries have landed on the sacred soil of our country nothing in general has remained. [...]. The Jews represent the only population which has never assimilated in Italy because it is composed of non-European racial elements, absolutely different from the elements from which the Italians have originated.
10. The purely European physical and psychological characteristics ought not to be altered in any way. Union is admissible only with European races.

The inconsistency of the main tenets of this manifesto with respect to the theories in vogue among Italian scientists was immediately apparent. A plain case of political imposition had clearly taken place. Mussolini felt that the fascist revolution was failing in one of its goals, that of making the Italians less "nice" and at once *tougher, implacable, detestable. That is, "masters"*, as was pointed out by Mussolini to count Galeazzo Ciano, the duke's son-in-law (Maiocchi 1999: 227). Racism and colonial apartheid were thus meant to form this *uomo fascista*, the new fascist man (Gillette 2002). Incidentally, two of the scientists who signed this declaration retracted when they were informed about its precise content, a further example of how fascism exploited science to prop up its power, and of how easily other scientists could disclaim the cardinal tenets of their own disciplines.

The repudiation of at least part of what allegedly was the official position of Italian science is not in the least a puzzle. Aryanism in particular was loathed because of its historical, cultural, and ideological connections with a tradition that Italians had ceaselessly fought for centuries. Embracing the Aryan dogma was equivalent to dismissing hundreds of years of continual struggle against Teutonic culture, embodied by the Barbarians, the Lanzknecht mercenaries and the Protestants, and culminated with the Independence Wars (Risorgimento) of the previous century and, finally, that Great War which had claimed such a huge number of Italian lives for the sake of the unity of the nation. How could Italians ever forget that, especially as they were being bombarded by a massive nationalist propaganda campaign centred on the revival and nostalgia of those epic struggles?

Besides Giuseppe Sergi, a foremost Italian anthropologist, who had reminded Italians how Etruscans had once driven the Aryans away from Italy, Mussolini himself had called the Aryans a "progeny of savages" (Israel & Nastasi, 1998) and National Socialism a revolution of the old German tribes of the primeval forest against the Latin civilization of Rome (Gillette 2002: 46). He apparently changed his mind or, most likely, he simply feigned an identity of views with Hitler that did not exist. This is what we deduce from a disconcerting testimony of Mussolini's *Realpolitik*, namely, a letter he sent to his sister Edvige and his niece Rosetta concerning his anti-Semitic turn (Girelli 2001: 317):

La purità della razza in questo popolo sul quale sono passate tante invasioni e che ha assorbito tante genti dei quattro punti cardinali, e il pericolo semita in una nazione come la nostra dove persino l'alta finanza, e perfino se manovrata dagli ebrei, non può non diventare qualcosa di cattolico (io, tra parentesi, so che tu e altre persone della tua famiglia aiutate gli ebrei, e non me ne dispiace, e penso che così potete constatare l'assoluta labilità delle nostre leggi razziali) sono evidentemente fandonie da lasciar scrivere a certi relatori. Ma se le circostanze mi avessero portato a un asse Roma-Mosca anziché a un Asse Roma-Berlino, avrei forse ammannito ai lavoratori italiani...l'equivalente fandonia dell'etica stakanovista e della felicità in essa racchiusa.

[The racial purity of this people [the Italian] that has endured many invasions and absorbed so many other peoples from the four corners of the world, and the semitic threat in a nation like ours where even high finance, even if manoeuvred by Jews, cannot but become Catholic to some extent (I myself, incidentally, know that you and your relatives give aid to Jews, and I don't mind, and I think that in this way you can observe the absolute evanescence of our racial laws), is evidently nonsense that will be dealt with by certain bills' proponents. But if circumstances should have led me to an axis Rome-Moscow, instead of an Axis Rome-Berlin, then I would perhaps have cajoled the Italian workers...the equivalent nonsense of Stakhanovism and the happiness it involves]

In public he naturally held a different opinion:

a pure Italian race is already in existence. This pronouncement [rests] on the very pure blood-tie that unites present-day Italians...This ancient purity of blood is the Italian nation's greatest title of nobility.

Connor (1994: 194)

But, at the end of the day, was there a veritable eugenic movement in Italy, or was it all part and parcel of Mussolini's political plans? It seems to me that the answer is twofold. Italian eugenics developed independently within the cauldron of Latin eugenics for the greater stress placed upon environmental factors and a wide though not unchallenged dissent on the viability of negative eugenic measures (Schneider and Stepan in Adams 1990). These divergences were certainly not of an exclusive scientific nature but had much to do with nationalistic bents (Carole 1995). When Mussolini and his minions acknowledged the usefulness of eugenics as a scientific and social ideology that would reinforce the hold of fascism over the Italian society without fraying its relationship with the Vatican, they saw that it evolved in a moderate direction until the *raison d'Etat* prevailed. That deliberation turned out to be an egregious miscalculation and concurred to spell the end of fascism. Anti-Semitism and Nordic racism met with indifference, if not open hostility, on the part of the scientific community, the Church, and public opinion that never forgave Mussolini his acquiescence with German scientism and rabid racism⁸¹. The fascist leadership, true to the omnipresent fascist slogan – *me ne frego* (literally, "I don't care") – carried on with this widely opposed plan and, in addition to other crimes against humanity, attracted further opprobrium by ordering the authorities to assemble all Jews and send them to Nazi extermination camps. This rather foolish intention of waging war against all traditional institutions is testified to by Guido Landra, one of the leading theorists of racism in fascist Italy, when he explains that:

A monopoly of Italian scientists would be dangerous – especially new converts – because monopoly means school, and school means University, and the Italian Universities are enemies of racism, they are proponents of Jewish intellectualism; in a word [they are] menacing dissidents.

Gillette (2002: 67)

The patent futility of pursuing eugenic policies in Italy meant that one of the most ambitious social plans ever attempted, namely the transformation of a non-militaristic country into an imperial power, and of its family-oriented citizens into war-machines, was bound to fail.

⁸¹ Italians were not strangers to racism, but apparently their racism was strong enough to tolerate exterminatory practices.

4. SCIENCE, UTOPIANISM, AND THE ENGINEERING OF LIFE

La philanthropie, c'est-à-dire la méthode philosophique d'aimer et servir l'humanité, est plutôt votre bannière que la charité, qui est le devoir chrétien d'aimer et secourir son prochain. [...]. La charité est satisfaite quand elle a soulagé l'infortune ; la philanthropie ne peut l'être que lorsqu'elle l'a prévenue [...]. Les améliorations, son ouvrage [du philanthrope], loin de cesser avec lui, se transforme, tôt ou tard en institutions

«Rapport sur les travaux de la Société de morale chrétienne» (1821) (Anne-Laure Simonnot, 1999: 28)

Wir bezwecken keineswegs, eine neue menschliche Rasse, einen Übermenschen zu schaffen, sondern nur die Defekten Untermenschen allmählich durch willkürliche Sterilität der Träger schlechter Keime zu beseitigen, und dafür besserem sozialere, gesündere und glücklichere Menschen zu einer immer größeren Vermehrung zu veranlassen

[We by no means aim to shape a new human race, a overman, but only to gradually eliminate the defects of the unfit through enforced sterility of the carrier of inferior germ-plasm and instead to cause more sociable, healthier and happier people to multiply]

Swiss psychiatrist August Forel in 1892 (Dörner in Thom & Mitja Rapoport 1989 193-194)

The line between paternalism and idealism on the left is a thin one. On the one side lies the belief that the left knows best. At its root is the notion of false consciousness, meaning that those who act in a certain way do so because they are unable to perceive the objective nature and source of their oppression. On the other side is the hope we can build a better world if people look beyond their individual interests to the collective good. At its root is the evangelical notion that a better world is possible if people would only have the confidence to fight for it.

Gary Younge, The capped crusader, The Guardian, Saturday October 4, 2003

According to Giorgio Cosmacini (1997) the nineteenth century was the century of health. The eternal struggle of doctors against suffering and sickness was dramatically intensified by pauperism and proletarianisation, which accompanied the industrial era. The medical profession became aware that the progress they championed at times acted as an important pathogenic cause, especially when the organism was subjected to taxing working hours under unhealthy if not appalling conditions. Hence the genuinely idealistic proclamation of Augusto Murri, one of the greatest clinician in Italian history, that *noi ci schieriamo tra coloro che combattono più ardentemente per un ordine nuovo* [we side with those who fight most fervently for a new order], meaning that the scientific identity of medical professionals had to be integrated with authentic humanitarianism and secularly missionary commitment (Cosmacini 1997: 349). Many agreed that “science and humanity” would be the universal motto of the century.

Analogous aspirations have been described by Jack Ellis in “The physician-legislators of France” (1990). In this work the author points out that between French defeat in 1871 and the WWI French medical professionals sympathised with the republican Left and acted as the legislators’ “spiritual guides”. Their active participation in French political life led to the unusual circumstance in which doctors exercised a disproportionate influence over French political life. Ellis also provides additional data that point to a wider and growing trend, taking place all over the world. Physicians, drawing on their intimate awareness of the life conditions of the poor and the outcast, came to believe they could and had to intervene to change the status quo. For example Henri Henrot is reported as saying in a speech he delivered at Reims in 1890 that:

You ask yourself with growing anxiety whether all these maladies that cause the physical and moral degeneration of men, women, and children are truly necessary in modern society, and you ask yourself whether there is not a cure to prevent these unfortunate people from falling so fast and so far. At this point, you are conscious of the social role that you are called upon to play... As a hygienist, you realize that you have a duty to make a supreme effort to stop the development of diseases that can be prevented

Quoted by Ellis (1990: 47-48)

Thus, in Germany, numerous doctors joined nationalist movements for the German unification and some fought on the 1848 barricades. In Italy and Iberia, doctors commonly exhibited advanced political ideas that they sought to put into practice by fostering social hygienic policies. Curiously, besides Turkey, Russia, and China, the greater incidence of activism among medical professionals was to be found in countries with a Latin background which, incidentally, never adopted eugenic measures. Among others Ellis mentions José Rigal in Manila, Juan B. Justo in Argentina, the translator of *das Kapital* into Spanish, and subsequently Salvador Allende and Ernesto "Che" Guevara. The thrust of his argument is that doctors identified preventive medicine as a formidable means of enhancement of laypeople's standards of living and interpreted the role of the State as aiding the sick and the poor. To corroborate his point Ellis refers to Jules Guérin, editor of *La Gazette médicale de Paris* who held that only doctors *understood the defects of social organization and the means by which to improve the physical and moral condition of the lower classes* (Ellis, *ibidem*: 8). It was arguably a sincere concern for medicine and the well being of people at large that induced French physicians to enter the political arena and form a specific, progressive political agenda. They were no mavericks, but successful practitioners, who felt compelled to apply their remarkable skills on a larger scale. A similar case of social engagement of scientists has been analysed by Colin A. Russel (1983), and took place in early XIX century England, when a close relationship between science and medicine on one hand and republican ideals on the other was formed. Many scientists acted with alacrity as radical reformers, regardless of the damages that could derive from such a stance in a society that fervidly contrasted radicalism in politics (Russel *op. cit.*).

In turn-of-the-century South Africa, the special aptitude of doctors in politics was particularly dear to Darley-Hartley, the founder, owner and editor of the South African Medical Record (SAMR), an avowed eugenicist who openly subscribed to the organic view of society that was extremely *en vogue* in those years (Klausen 1997: 34):

it seems to us that medical training has much to do with the attainment of political eminence by medical men. First, we must have higher education... Second, receive logical training... The man accustomed to diagnose the diseases of the individual body, and to guide his therapeutic accordingly, consciously or unconsciously follows the same lines of thought in diagnosing and treating the ailment of the body politic. Again, medical men have an enormous advantage over almost all others, in the fact that their daily work brings them into contact with every class of the people, gives them a knowledge of the wants of all... And, lastly, your medical man soon finds out in practice how disastrous "nibbling" treatment is, and in politics he invariably goes right through a question and takes up the responsibility of a definite position just as he has to do when he is face to face with a case requiring operation

A change took place in France and in South Africa at around the same time, i.e. in the 1910s (Rich 1990), when the newly elected physicians displayed more conservative sympathies, as their status was secure and their social and political battles had been successful (Ellis *ibidem*). In France nationalism strongly interfered with their political career when, charmed by mounting chauvinism, they started worrying that Germany could eventually subdue France. The final blow to their idealism was most certainly their professionalisation, with the concomitant surfacing of obscure jargon, monopoly of practice, adherence to norms and interests strictly internal to the professional category, and so forth (Diego Gracia in Dou 1987). In Germany Charles E. McClelland (Torstendahl 1990) has detected an analogous shift towards corporatism deriving from professionals' pride in their expertise and erudition, as well as their acceptance of the inevitability of a strong presence of the State, which could also strengthen their social status.

Now, my contention is that since the beginning of the 20th century bio-medical scientists have picked up the discourse of scientific activism and that this event could lead to the intrusion of the State in the private sphere. One clear example of this in advanced democracies is the activity of McGill university's professors between the turn of the past century and the beginning of the Second World War. Sebastian Normandin (1998) explains that they acted as pundits, committed through lecturing and newspapers articles to the propagation of eugenics as a miraculous but scientific panacea to all modern social ills. Those leading biologists who in the 1930s issued the statement entitled "Social biology and population improvement" were likewise progressive. They claimed that (Freeden 1979: 650):

The most important genetic objectives, from a social point of view, are the improvement of those genetic characteristics which make (a) for health, (b) for the complex called intelligence, and (c) for those temperamental qualities which favour fellow feelings and social behaviour rather than those (today most esteemed by many) which make for personal success, as success is understood at present

Likewise, the "Geneticists' Manifesto", published in Edinburgh in 1939, stated:

This will result in its being regarded as a honour and a privilege, if not a duty, for a mother, married or unmarried, or for a couple, to have the best children possible, both in respect of their upbringing and of their genetic endowment, even where the latter would mean an artificial – though always voluntary – control over the processes of parentage

Bajema (1976: 265)

What seems self-evident is that the liberal view of the relation of science to society is a comparatively recent acquisition of scientists' professional ethos. This view regards scientists' social engagement as most advisable to the extent that it prevents bad policies from being implemented, popularises the latest discoveries, and stands out against sloppy or biased scholarship (Dunn 1962). But it is also one that does not overlook the fact that to become spokespeople and seek to shed light on matters concerning the public at large also involves the temptation, at times irresistible, to poach on other professionals' preserves and lose both objectivity and the sense of proportion (Nelkin & Lindee 1995)

Ideology and hegemony have oftentimes made a crucial impact on science (Nader 1996, 1997). Emblematic in this sense are two manifestoes and a speech made at the beginning of the Great War. The speech was the one delivered by Max Planck at Berlin University on October 15th 1914 and, by means of trite but effective rhetorical devices such as the poeticising of death and of the spilling of blood for the sake of one's country, it called upon young scientists to sacrifice everything to their Fatherland (Haberer in Cerruti & Fazio 1976: 40). The then fiercely antagonistic German and French scientists compiled the two manifestoes. In their *Aufruf an die Kulturwelt* (4 October 1914), the Germans addressed international public opinion accusing France and Great Britain of consorting with Russians and Serbians and unleashing Negroes and Mongols against the white race (Haberer, *ibidem*). The French responded with their *Les allemandes et la science* (1916) in which they stated that German science was inferior to French science and explained why in their opinion it was so. In the United States several German scientists were prosecuted as spies or interned and generally American scientists did not vouch for them (Allen 1978). This confrontation and mutual ostracism was to last longer than the discord between politicians of the two sides.

Besides nationalism another powerful ideology was scientism and its attendant conviction that what is technically feasible must be done. A disquieting example of where a scientific mindset unaided by adequate ethical reflection may lead is Vanevar Bush's reaction to the dropping of the atomic bombs at the end of WWII (cited by Toulmin in CIBA 1972: 30):

By that time I knew that civilization faced an utterly new era, and I felt that it might as well face it squarely... If for no other reason I would justify the use of the bomb at Hiroshima and Nagasaki because it was the only way in which the dilemma could be presented with adequate impact on World Consciousness.

Now, this phenomenon has huge implications in an age of genetic engineering and persistent racism. The social perception of the life-science and their social function appear as massively influenced by how biomedical scientists interpret their social role through science advocacy and scientific activism, which in turn conditions society's self-perception. The next chapter explores this intriguing phenomenon.

4.1 AKIRA UNBOUND: SCIENCE, MYSTICISM AND UTOPIANISM IN POST-INDUSTRIAL SOCIETIES

It is not unprecedented for fringe groups to serve as incubators for concepts that would not be acceptable in mainstream science: think of the Aum Shinrikyo sect and its ventures in biological warfare. [...] The Raëlians have a knack for drawing in pleasant, attractive, professionally successful people in scientific or technical fields. [...] The Raëlians are just a bunch of people who took literally the cliché that science is replacing religion.

"A grieving family hopes to replace a lost child. A genetics-obsessed sect dreams of achieving immortality. Is this how human cloning will begin?" (Margaret Talbot, *The New York Times Magazine*, February 04, 2001: p. 40)

I believe with Schopenhauer that one of the strongest motives that leads to art and science is escape from everyday life with its crudity and hopeless dreariness, from the fetters of one's own ever-shifting desires

Albert Einstein (Goldman 1989: 149)

What I'm getting at is that if you examine the history of science you can see that it has been manipulated in the name of politics and religion. The Nazis did this. There's been lots of sham science that in retrospect was misguided. And this has brought untold harm to society. Granted you're a person who closely gathers evidence, but most people, told by authority figures that something is "scientific", swallow it whole and go along with whatever they say. And to me that's very frightening

Murakami Haruki speaking to Hiroyuki Kano, an AUM-Shinrikyu member claiming that he wanted to mathematically prove Buddhism (Murakami 2001: 222)

The weakening of Shintoism following defeat in WWII and the slow but progressive decline of Buddhism among the young generations, has produced a moral void for thousands of Japanese (Kaplan & Marshal 1996). Simultaneously, the traditional religions have given ground to occultism, mysticism, and guruism. In 1993 there were 231,019 registered sects in Japan and two hundred million members, even though the Japanese population amounts to less than 130,000,000 people (Murray Sayle, *The New Yorker*, April 1, 1996). Many Japanese simply join more than one religious organization, indifferent to conceptual and ethical inconsistencies. In fact, these new religions enjoy the clear advantage of not having to prove any consistency of behaviour or doctrine. They sometimes profess a millenarian faith in an incipient new world order and, as a rule, they merge divergent traditions in a heterogeneous hotchpotch.

We must also add that, historically, in Japan pluralism had little prospect to become conducive to the shaping of one's own identity. Conformity, acquiescence, deference and devotion to parents and superiors, have always embodied the cardinal Confucian virtues. After the war, all of a sudden millions of people found themselves catapulted into democracy, without having the slightest idea of what that entailed. In a word, the institution of democracy was introduced without laying the foundations of a culture of democracy (Maruyama 1969). These factors may in part explain the triumph of apocalyptic visions translated into *manga* and cults.

What does *manga* stand for? This term literally means "mocking, derisive image", that is to say, a comic or a cartoon. *Mangaka* is the cartoonist. The importance of manga in Japanese culture cannot be overstated. Suffice it to say that Asahara Shoko himself, the leader of a sect of techno-terrorists called Aum-Shinri Kyo⁸², whose nature and aims constitute the main topic of this chapter, drew a manga entitled *Metsubô no hi* [the Doom's Day] giving away what he meant to accomplish (Manzenreiter 1995). The popular belief had it that the *saikimatsu* [the end of the century], would coincide with the *Jidaimatsu* [the end of time, apocalypse] and this was unquestionably due also to the enormous success of Nostradamus' prophecies in Japan (Manzenreiter 1995)⁸³.

⁸² « A » stands for creation, « U » for continuation, « M » for destruction

⁸³ *Much of Japanese science fiction, from the turn of the century on, has had a distinctly and memorable bleak view of society, as is common with Western science fiction as well. Indeed, the twentieth century in general has long been considered the age of the anti-utopia* (Napier 1993: 329)

The most representative comic of this kind is arguably Akira, which first appeared in Young Magazine in December 1982. The protagonist, struggling in a post-nuclear Neo-Tokyo (completely destroyed by a nuclear experiment and then rebuilt), is Kaneda. Kaneda is some sort of *bōsōzoku* (from *bo* violent, *so* to run, and *zoku* tribe) that is, the member of a gang of reckless drivers that in Japan form a real subculture. *Bōsōzoku* defy police authority, use Chinese characters for their gangsta name, wear uniforms of kamikaze pilots, all symbols usually associated with extreme right-wing political movements and yakuza members (Standish in Martinez 1998). Kaneda is *kōha* - macho and gallant - and displays *makoto* - purity of motives - which is what legitimises his use of violence in the eyes of the reader. Isolde Standish remarks that

His qualities of efficiency and loyalty, combined with his failure at school and his ignorance, make him the film's embodiment of innocence and purity. Therefore he is qualified to become the founder of a new utopian society that will be formed after the old society has been purged through cataclysmic destruction

Standish (ibidem: 68)

With the benefit of hindsight, we could postulate that the founder of Aum Shinrikyo, Asahara Shoko, may have somehow identified with Akira. Born as Chizuo Matsumoto in Kyushu in 1955, due to a congenital glaucoma he suffered from impaired vision and was sent to a school for the blind. There, he bullied his blind schoolmates and sought to create a milieu that he could wholly control (Lifton 1999). He claimed one day he would set up his own "robot kingdom" (Lifton ibidem) and meanwhile read biographies of prominent politicians aiming to become the future Japanese Prime Minister. After graduating he went to Tokyo where he sought to pass the entrance exams at Tokyo university despite the fact he was most unlikely to pass them due to his physical impairment. He failed and had to resign himself to earn his living as an acupuncturist and healer, the reason why he joined Agonsh , a New Religion, and took yoga classes. When his business failed, he went to India (in 1986), resolute to attain enlightenment. Back in Japan he pretended he had gained a considerable level of sanctity and command of his magical powers and changed his name to Asahara Shoko. Afterwards he planted a new religion and named his sect "Aum Shinri-ky " ⁸⁴, and proclaimed he was "Today's Christ" and "the Savior of This Century" as about 40,000 thousands of Japanese and Russians flocked round him. After an initial peaceful slant towards cosmic harmony, in the course of time his teachings changed their tune shifting towards ideological totalism ⁸⁵. Asahara integrated his doctrine with the vision of an imminent Armageddon and this induced his disciples to follow him and found a segregate community on the slopes of Mt. Fuji. In such a setting Asahara's power over his followers and their devotion to him grew inexorably. At that point the Japanese public realized that their methods were not only unorthodox but patently illegal. In their "splendid seclusion" Asahara's acolytes developed sophisticated techniques of mass-killing and stored weapons and high technology meant to support their plan to annihilate Japan. On June 27, 1994 they carried out the first bio-terrorist attack in history, in Matsumoto, causing a death-toll of seven and injuring hundreds of people. On March 20, 1995 their most notorious action, the assault of Tokyo's subway network, killed 11 people and injured several hundreds. On both occasions more careful planning and execution would have caused a catastrophe, but the mere fact that the attempt was made and the consequences were of such a tragic scale proves that basic scientific expertise may turn religious fanaticism into a deadly weapon. Let me now describe how this event bears on the thrust of my research.

During the second half of the 19th century Ernst Haeckel held a huge sway on many young students of the life-sciences in the German speaking area. Their unstinting admiration is almost puzzling when one considers the complexity of the themes he treated and the blunt and brutal tones of some of his argumentations. Like sectarian devotees, Haeckelian monists addressed their guru emphatically (Gasman 1971):

⁸⁴ Aum = "powers for destruction and creation in the universe"; Shinriky = "teaching of the supreme truth" (Reader: 15)

⁸⁵ "Everything had to be experienced on an all-or-nothing basis" (Lifton, 1999: 25)

I thank Darwin and Haeckel for emancipating my intellect, for my deliverance from the bonds of traditional slavery, to which a great part of mankind is bound for all their lives. They gave me a key towards an understanding of the great exalted secret of nature and cleared the fog from my eyes which had hindered a clear view of the world

Another one commented

At that moment I rediscovered my fatherland and my people, and with that I was relieved of all unclarity and anger, of the irony of Heinrich Heine, which is a sign of inner weakness⁸⁶. Rather, there arose the strong feeling of cheerfulness and happiness which is born out of faith that is sure of itself. In this way Ernst Haeckel returned to me my faith in my people.

By way of comparison, Haruki Murakami's analysis of the mindscape developed by the followers of the Japanese pseudo-religious, terrorist congregation called Aum-Shinrikyo – many of whom were scientists and doctors – merits a full quotation (Murakami 2001: 306-307):

As I went through the process of interviewing these Aum members and former members, one thing I felt quite strongly was that it wasn't in spite of being part of the elite that they went in that direction, but precisely because they were part of the elite. [...] In that sense alone they had pure motives, and were idealistic, filled with a sense of purpose. [...] What they all had in common... was a desire to put the technical skill and knowledge they'd acquired in the service of a more meaningful goal. They couldn't help having grave doubts about the inhumane, utilitarian grist mill of capitalism and the social system in which their own essence and efforts – even their own reasons for being – would be fruitlessly ground down

A similar analysis of the root-causes of the Aum-phenomenon has been made by American journalist D. W. Brackett (Brackett 1996: 71-72) who observes that

As some of the newer generations graduated from college and entered the work force they began to have ideas and questions that their education had not prepared them for. In examining their own lives and the society in which they lived, many felt lost and wondered whether job security and social conformity were all there is to life. Seeking answers, they often naively reached out to anyone or any group that professed to have a solution or held out the promise of involving them in something bigger than themselves. Earnest and sincere, once they made the leap to a new faith, they wrapped themselves in it with the single-mindedness of people who never intended to be lost again

Asahara's foolish plan was also inspired by Isaac Asimov's "Foundation series" (Disch 1998), whose key character, Hari Seldon, is a mathematical prodigy as well as the discoverer of a new discipline, psychohistory, enabling its practitioners to attain true predictions. The plot revolves around the failed attempt made by Hari Seldon to warn the Empire of the looming disaster and the ensuing assembling of the best thinkers of the Empire in order to found a sect that will preserve the wisdom and knowledge accumulated up until then. The prediction turns out to be true and the sect's acolytes find themselves ruling the universe as no one else has any command of science anymore and they are regarded as wizards.

What occurred in Japan in 1995 was that the reportedly safest country in the world was shocked by the revelation that the perpetrators of a terrorist attack against Tokyo's subway which was meant to murder thousands of Japanese and create mayhem across the entire country were talented Japanese students. The highest ranks of AUM comprised mainly relatively young scientists who pressed for the adoption of extreme measures towards the "final solution" of all Japanese plights, i.e. its obliteration (Reader 2000). The weapon selected was the deadly sarin gas, invented by the Nazis and already successfully tested by Saddam Hussein in his war against Iran, the time and the place the most appropriate for a huge massacre. In the Tokyo subway these criminals were to riddle with the tip of their umbrellas several bags filled with this gas. The number of victims was comparatively limited thanks to the presence of mind of some travellers who upon smelling the gas' odour quickly opened the windows and dispersed part of the lethal content. As mentioned before, the analyses of the survivors are quite disparate, but I have every reason to believe a common denominator can be singled out, that is, the sentiment that

these people have a completely different ethic, they think differently to us, they totally believed in what they did...they don't live in this world, they're from another dimension

⁸⁶ It is useful to remind the reader that Heinrich Heine was considered a traitor by German nationalists and conservatives because he was a baptised Jew, left-wing intellectual, cosmopolitan and, to add insult to injury, he resided in France. In 1892 not a single German local administration accepted to erect a monument in his honour (Glaser 1978).

The mass media undoubtedly contributed to this inaccurate portrayal by presenting a specific, univocal aspect of the terrorists' biographical profile, one accurately worked out in order to conceal the banality or "familiarity", of their aims and beliefs. Murakami himself remarks that "the moral principle at stake in the gas attack was all too clear: "good" versus "evil", "sanity" versus "madness", "health" versus "disease" (Murakami 2001).

In order to understand this tragedy we must bear in mind that as an adolescent Asahara wished he could become a doctor, but his application was rejected due to his bad eye-sight. Afterwards he resolved he could still help people by working as an acupuncturist, but he soon became aware that he was not able to really cure his patients through either the Western or the Chinese medical tradition⁸⁷. It was then that he became an obsessively religious person (Metraux 2000). The activities of the sect he founded, Aum-Shinrikyo, were correspondingly centred on the therapeutic treatment and salvation of psychologically and physically sick individuals. In the course of time the sect espoused Mahayana Buddhism, which aimed at the salvation of all mankind and eventually there emerged a messianic and millenialist approach to the solving of the social question which involved the belief that bio-medical sciences could redeem the world and bring about a harmonious and peaceful society:

Aum's leaders considered themselves elite intellectuals, revolutionaries dissatisfied with the stuffy stable world they saw around them.. They were political technocrats, tired of a fat, lukewarm society. Possessed of hypertrophied imaginations, they were convinced they could change people and build a perfect state

Yamaori Tetsuo (Metraux 2000: 79)

Eventually the belief prevailed that killing animals is wrong whereas human beings, who purposefully commit misdeeds, cannot be spared (Kaplan & Marshal 1996).

Celebrated Japanese novelist Haruki Murakami became deeply interested in the motivations that led AUM-acolytes to adopt such a extremes views. The result of his inquiry makes for a compelling reading that sheds light on fragments of life and thoughts that, once more, sound by no means unfamiliar to a Western reader. Murakami depicts the cultural and psychological universe of some of the members revealing traits of their personalities that are worthy of a closer examination. For example, we are told by Hiroyuki Kano (Murakami, op. cit.: 218) that since he was an adolescent he conceived a drive to attain a superior knowledge that neither adults nor peers could fulfil. He maintains having spent hours pondering over the most vexed existential questions without reading through any book, for *I don't like reading. When I read something I just see what's wrong with the book* (Murakami, ibidem: 218). Although his interests revolve around Buddhism and his own search of a mathematical demonstration of it, he candidly concedes that he never got into depth with any study of Buddhism, as *the ones I read didn't seem very direct in their approach. I couldn't discover the remedy I was searching for* (ibidem: 220). Following this statement Murakami challenges the interlocutor noticing that to discard all opinions running against one's own makes impossible to obtain true answers. Accordingly, Hiroyuki Kano proclaims (Murakami, ibidem: 224) that no doubts remained, because all our questions were answered. *We were told: "do this, and this will happen." No matter what question we had, we got an answer straight away. I was completely immersed in it.* Another member, Akio Namimura (p. 233) reiterates that *he [Fumihiko Jōyū, the sect's spokesman] could answer any question clearly* and a third one, Mitsuharu Inaba lends further support to this impression by affirming (p. 241) that *I was really impressed by what he (Joju) said. It was so clearly stated – the way he used metaphors, for instance...after the sermon he took questions, and his answers were extremely precise, each one perfectly tailored to the person who asked it.* Another trait emerging from their accounts to which they attach a particular importance is the favourable turn taken by their lives when freed from the burden of their responsibilities. Harumi Iwakura doesn't deny that the appeal of the sect stemmed from the

⁸⁷ It is emblematic that one of his future devotees, neurologist Sasaki Masamitsu commented on his life-choices as follows (Metraux 2000: 106): *As a doctor I specialize in neurology and deal with patients with diseases such as cerebral apoplexy, Parkinson's disease, muscular dystrophy, and cervical spondylosis, diseases for which there are no definite cures. I feel keenly the limits of Western medicine and the powerlessness of a doctor*

fact that the way they did things made life easier – they'd give the order and you just did what they said. No need to think for yourself, or worry about every little detail, just do what you're told.

Here you can find the most glaring example of the sort of people Dostoevsky's Grand Inquisitor believed he was morally obliged to guide, people who are willing to yield to the persuasive arguments of someone who claims he/she shall relieve them of every responsibility and heal whatsoever an anguish. These young men and women joined the sect so as to withdraw from reality, shut out all their fears and misgivings, for they were likely to be already estranged from real life, incapable of facing their psychological unease, their mental and nervous strain, their anguish, their overburdening responsibilities and prone to irrationality, regarded as a safe shelter: *they weren't inherently bad, or evil people they were people in search of an absolute, a fine line between what they take to be absolute purity and going over an edge where everything in the world is so defiled that it must be destroyed*⁸⁸.

The highest ranks of AUM comprised mainly young scientists and from them came the decisive thrust to adopt extreme measures for the "final solution" of the Japanese plights (i.e. the demise of the whole country):

it was with the growth in influence of what I term the "science lobby" that Aum's apocalyptic visions began to be framed in such vividly destructive forms and that a consciousness of advanced and destructive forms of weaponry became instilled in the upper echelons of the movement.

Ian Reader (2000: 187)

That science is still by many identified with hygienised laboratories and purity of motives explains why Aum-Shinri-Kyo made science a sacred enterprise. Sacred and profane mingled and their boundaries became more and more blurred while fascination for state-of-the-art technology and science was used to awe its followers. We know that Shoko Asahara, the guru founder of the Aum sect, had given precise instructions to screen the top Japanese universities in search of brilliant researchers that might turn useful to the pursuance of several tasks. Subsequently they were kept too busy to reflect upon the consequences of their work, a not uncommon occurrence in today's fast-paced R&D. Intuitively, ceaseless activity allows for little critical thinking⁸⁹, and Hitler understood this when he stressed that his party was a *Bewegung*, a movement (Housden 1997).

My impression is that what happened in Japan could occur elsewhere. Aum-Shinrikyo is not the manifestation of a peculiarly Japanese techno-scientific alienation but rather the perversion of what has been the main purpose of techno-science ever since the Enlightenment, namely the betterment of mankind. The common trait of Aum bio-medical experts was a desire to put the technical skill and knowledge they'd acquired in the service of a more meaningful goal so as to offset the deleterious and alienating effects of unbridled capitalism (Murakami 2001: 307) and of hyper-rationalistic, emotionless science (Reader 2000). Incidentally, the same applied and applies to many eugenicists. Theologian Langdon Gilkey (in Robinson 1977) fears that the success of occult and mysticism among youth may undermine the worldview that science has constructed over the past centuries. However, Helga Nowotny (Mendelsohn 1977) has remarked that historically magic has not been replaced by science when this latter has been able to demonstrate its superior efficacy, which was Malinowski's tenet; rather, it was magic's demise that made possible the triumph of science. Magic and mythopoeic thought have never been truly relinquished (Bayertz in Sandkühler & Holz 1987). The explanation of this phenomenon has perhaps been best formulated by Dorothy Nelkin (Mendelsohn 1977: 283-284) who believes that

People are most reluctant to surrender their personal convictions to a scientific world-view. [...] for many people religion may be more likely than science to provide a satisfactory explanation of reality on which to base their values. Faith in science persists only when it satisfies a social need. If science loses credibility, people will grope for more fulfilling constructs

While on the one hand science destroys the traditional collective mythology of Christianity, it at once paves the way for all sorts of science-inspired mythologies: supermen, designer babies, UFO, sci-fi cults, etc. Science actually

⁸⁸ Interview with Robert Jay Lifton, broadcast by freshair (<http://freshair.npr.org>) on December 18, 2001

⁸⁹ "Each self becomes a constellation or a collage that is ever in motion, a "self-system" or "self-process" (Lifton, 1999: 13).

undergoes a process of mythologisation (Henighan 1980) affecting scientists themselves. Hence the current persistency of a widespread belief in sophisticated brands of astrology even amidst the educated public and the proliferation of sub- and counter-cultures that set themselves the goal of merging science and magic in order to meet a rising demand for those answers that too many fail to find within the scientific realm (Wilkins in Fuller 1971; MacIntyre in Mendelsohn 1977; Nachman Ben-Yehuda in Neusner 1989). By the same token, biological thinking applied to social reform has constantly spawned scientific, at times Manichean, mythologies, especially in times of fancied or real profound crisis and insecurity, which generally coincide with the return of the sacred (Kaye 1986). Fervent biological reductionism *à la* Crick and Monod⁹⁰ and the messianic aspirations of socio-biologists to effect revolutionary alterations of the social structure are merely further developments of this process (Kaye 1986). Indeed, there is good reason to believe that the infatuation with techno-scientific advance and religious revivalism are by no means incompatible. For Francis Bacon human ascendancy was central to the Divine plan (Noble 1999: 51) and, in a broader perspective, scientific inquiry was boosted by millenarianism in England (Webster 1976) and by the Free-Masonic identification of salvation and improvement all across Europe (Noble *ibid.*), given that the Christian message of salvation needed to be substituted with an ideology of salvation entirely based on rational means (Pyneson, Sheets-Pyneson 1999). Enlightenment thinkers themselves were inclined to embrace some form of natural religion that substituted Man for God (McIntosh 1992).

Kevles (Byrne 1986) has noted that eugenics was infused with religiousness from its inception and that the authoritativeness earned by science had grown so strong that many clerics actively participated in eugenic campaigns:

One distinguished botanist bewildered Darwin by declaring himself a convert on the grounds that the theory finally made intelligible the birth of Christ and redemption by grace. A clergyman was converted on the grounds that it opened up new and more glorious prospects for immortality. And theologians declared themselves ready to give up the old doctrine of "the fall" in favor of the happier idea of a gradual and unceasing progress to a higher physical and spiritual state

Gertrude Himmelfarb (in Marsak 1964: 92)

On the other hand scientists' motivation for applying themselves so zealously to their tasks derives from the fact that for many the urge to pursue science is as strong as an urge toward a religious calling (Winter 1970: 27). In the course of the nineteenth century Rudolph Virchow (Kappeler 2000) maintained that science had acquired the attributes of a religion: *es ist die Wissenschaft bei uns zur Religion geworden*. Correspondingly, in the mid 1920s Leo Szilard, the eminent Hungarian-born physicist, planned to form a league of scientists in the Rosicrucian tradition, namely with strong religious and rational bonds (Noble 1999) and in the same period Russian eugenicist Nikolai Koltsov assumed that as cultivated mankind drew inspiration from religion, it was only too natural that eugenicists would rightly demand a collective sacrifice and much self-restraint in the service of the creation of a higher type of human being⁹¹. An unmistakably mystical-religious and superstitious character typified most of these very ideas:

Die Ausmerz-Ideologie im Zeitalter der Naturwissenschaften und der Biologie erscheint psychologisch gesehen als eine verkappte religiöse Schwärmerei. [...] „Euthanasie“ und Rassenhygiene erscheinen uns heute als ein massenpsychologischen Beispiel für die Macht der Aberglaubens über die Vernunft und Wissenschaft

[“From a psychological standpoint, the ideology of eradication in the era of natural sciences and biology appears as an instance of religious fervor in disguise. [...] Nowadays “euthanasia” and racial hygiene seem to us an example of the power of superstition over reason and science”]

Heinz Schott (in Propping-Schott 1992: 20)

In keeping with this analysis is for instance Julian Huxley's statement that eugenics...*is capable of becoming the most sacred ideal of the human race...one of the supreme religious duties...eugenics will inevitably become part of the religion of the future* (Huxley

⁹⁰ Howard Kaye (*ibidem*) has pointed out that French biochemist Jaques Monod became a biological reductionist after his disillusionment with Marxism and the prevailing in his worldview of pessimistic traits

⁹¹ Improving the Human Species in *Russkii eugeneskii zhurnal*, vol.1, no.1, 1922, p.273. Quoted by Ivan Frolov 1990: 188

1947: 22). Before long (Dunn 1951: 618-619), he went even further and displayed a remarkable identity of views with Teilhard de Chardin:

once the fact is grasped that we men are agents of further evolution, and that there can be no action higher or more noble than the raising of the inherent possibilities of life as represented by the human species, then we shall somehow find ways and means for overcoming the resistances which stand in the way of our performing that part of our destiny and our duty

Similarly, Robert Sinsheimer in 1968 referred to the future design of humankind as a cosmic event, and to those scientists involved in the imminent project as agents of transition to a wholly new path of evolution (cited in Nelson 1980: 95). In 1973 (Hilton et al. 1973: 350) he assumed that

much of our current despair derives from the perception that the enemy is "us", that is the corrosion and imperfection deep inside ourselves. But now we can be agents of evolution as we must devise that once again on this sweet planet a fairer species will arise – a being new and finer to expand the meaning of life

This is how in 1974 a Berkeley molecular biologist, Gunther Stent, expounded in an article published by Nature his utopian vision:

To oppose human cloning... is to betray the Western dream of the City of God. All utopian visionaries, from Thomas More to Karl Marx, think of their perfect societies as being populated not by men but by angels that embody all of the best and none of the worst human attributes

Quoted in PCBE (2002)

In the first half of the Nineties biologist and oncologist van Rensselaer-Potter (1990; 1995) urged a few good people, by necessity true believers, to propel a cultural revolution premised on a brand new kind of global bioethics enabling humankind to overcome its genetic predisposition to material acquisition and day to day planning, to the detriment of the long-term interests of the species, one that threatens to bring human beings to their extinction. This pseudo-religious commitment has been echoed by none other than John Tooze, secretary of the Human Genome Organisation, who once observed that the HGP was about writing the bible of secular humanism (Müller-Hill 1993: 406). Kenneth W. Culver, physician and geneticist admits that he takes Jesus Christ as a model of medical practice for He used extraordinary powers in his ministry to heal the fundamental bases of illness (Cole-Turner 2001). Francis Collins, director of the human genome project and a Christian, described his endeavour as a work of discovery which can also be a form of worship (Noble 1999: 195), and judges unethical all forms of delay in the application of genetic discoveries because Christ himself was a healer (Appleyard 1998). One of my interviewees did grant that there was some truth in my hypothesis that science is such an exciting enterprise that sometimes it may almost become a religious or mystical experience:

I've seen great scientists who are very dedicated to their work, sacrifice countless hours... what for? To show what they believe is valid. But at the same time, I've also seen honorable scientists fight over power. It's not about benefiting people with a great new discovery anymore, but about the struggle to gain power. So in this regard, yes, I can say that overexcited, enthusiastic scientists are so focussed on the little things that they miss the big picture.

Unsurprisingly, given the intensity of religious devotion and church-affiliation in the United States, a survey conducted by Vaughan, Smith, and Sjoberg (Vaughan, Smith, and Sjoberg 1966) indicated that over three-fourths of the scientists they contacted were members of some sort of religious body and only 1.4 percent of the respondents designated themselves as atheists or agnostics. However, almost 40 percent of them did not believe in life after death as opposed to one third of the respondents who instead believed there was actually something in the afterlife. 60.9 per cent looked to science and religion as two compatible but separate spheres of life and 17.3 percent as complementary and only 13.6 percent as conflicting. This religious outlook of course makes for a missionary commitment to the betterment of Creation which was not rare among eugenicists (Carole 1995). A clear instance of such a staunch dedication is V. Elving Anderson, a medical geneticist, who interprets God's injunction to fill the Earth as a green light to redesign the kinds of human beings we, and implicitly He, want on Earth (Noble 1999). But an even more ambitious goal has been set by Lee Silver (Silver 1998: 250), a molecular biologist and a neuroscientist, whose description of the future is strongly reminiscent of Wellsian utopias.

Genetically enhanced elite-members – GenRich – engineer more advanced human beings, who in turn shape a further improved generation until *they find themselves coming face to face with their creator... Or is it simply their own image in the mirror, as they reflect themselves back to the beginning of time...?* Marcy Darnowsky (Tokar 2001) has perfectly synthesized the nature of such vagaries:

Silver vividly and accurately represents the techno-eugenic vision, a horrifying grandiose ideology shared by a disturbing number of Nobel laureate scientists and other influential professionals. [...] They are motivated by a technocratic utopianism similar to the impulse that has always motivated supporters of eugenics: the urge to engineer human "perfection".

Indeed eugenicists of the past have been described as possessed of a zeal and passion reminiscent of *a religious cause or a political reform movement* (Smith 1985: 137) and some latter-day eugenicists, like their precursors, act as though they had espoused the freemasons' tenet that the God of Genesis has acted as a Single Artificer and humankind is expected to take up His demiurgical action (Luria in Byrne 1986). These curious attitudes can be better comprehended in the light of the socio-cultural changes taking place in Europe in the second half of the Nineteenth century when science became not merely one of the possible grounds for social ethics but an ethic in itself, and indeed *the highest, prescribing duties and claiming undeviating allegiance, like a religious vocation* (J.D. Burrow 2000: 53)

Having experienced this phenomenon in the first person, biologist John Vandermeer has shed light on the mechanism underlying this mutual attraction of science and religion. Initially he still believed in science as a *modus vivendi* (Miller 1997), and that evolutionary biology could make sense of it all: *the interplay of natural balance, evolutionary biology, and overpopulation then became something of a new religion for me* (Vandermeer 1996: XV). Then, after one of his rhetorical exploits, his first wife caustically commented that his scientific method to explain away all misgivings and obscurities of people's lives was not scientific at all, but appeared as dogmatic and doctrinaire as a religious outlook. Nowadays he fiercely combats his former intellectual posture. Another scientist who defected from certain extreme views of the social role of science was Italian-born microbiologist Salvador E. Luria (1912-1991), who directs his remarks (Luria 1984: 202-203) to those scientists for whom *science is some kind of sacred priesthood before which all other interests and considerations must yield*, those who *look upon science in the same way a truly religious Catholic would look upon life within the Church, as a dedication to a supreme, ideal set of values*, and feel comforted in believing that *one belongs to a elite, not of birth or wealth, but of professional worth, a feeling of election or divine blessing*.

The relevant literature and the evidence I have gathered so far seems to point to a high degree of idealism in scientists' behaviour. One confirmed that:

La scienza può diventare davvero come una droga che rende dipendente, o un vizio mentale. Se ti capita di avere un buon risultato, sei "ruminato" per sempre: il piacere che ti deriva, ti spinge a cercarne ancora, per anni ed anni... A parte gli scherzi, credo che lo scienziato sia qualcuno innamorato della scienza e del processo scientifico, e questo è l'unico motivo.

[Science may really become a drug that addicts you, or a fixation (literally, "mental vice"). If you happen to attain good results you are "doomed": the pleasure you derive pushes you to look for more, for years upon years... Joking apart, I believe a scientist is someone who is in love with science and with the scientific method, and this is the real cause]

Some of the biotechnologists I interviewed were genuinely persuaded that their adherence to the anti-global movement was, in a way, the corollary of a life dedicated to better understand the world in order to change it for the better. Likewise, a student of a biomedical discipline declared:

I am a Christian, and by no means do I think it unholy to clone. God gave us a mind to think. The Bible teaches us to serve mankind and to be righteous. If we can free people from a poor prognostic future, why not?

This is a biochemist's reply to the question why she resolved to become a scientist:

siempre quise ser científico porque civo que el trabajo que desarrollamos cada día es diferente y aunque puede ser a la larga una rutina, el ser científico te da la oportunidad de descubrir algo que puede ser de gran valor para la humanidad. [Now switching to English]. Don't you think that when you were a child you wanted to find a drug against cancer?

Responding to a different question she added:

No quiero ser arrogante, pero sin científicos muchas de las comodidades que tiene la sociedad ahora no serían posibles. Incluso gracias ellos, casi todas las enfermedades que aparecen en estos días (nuestro mayor enemigo) pueden ser combatidas y la esperanza de vida es mucho mayor

In fact, a majority of interviewees appear to be uneasily caught in the middle of two antagonistic forces.

Idealism:

1. a personal predilection for the struggle of minorities to see that their rights be acknowledged;
2. a keen concern for the state of the planet;
3. a profound conviction that their activities would benefit humankind at large.

and pragmatism:

1. the awareness that scientific research must proceed and cannot stoop to compromises;
2. that private investors and the State are the only guarantors that their skills will be put to good use;
3. that patenting infringes a number of rights but is essential to the scientific pursuit;
4. that cloning and eugenics therapy lie ahead and it is up to their users to not abuse of those techniques;
5. that science is simply too exciting and arduous to be bad.

It is possible that idealism, and my guess is that this is particularly true with highly sensitive individuals, gets systematically frustrated by external pressures and may be bent to detrimental ends when the pendulum swings to the opposite hand and scientists put on the pragmatic hat. It's at that point that the effects of science intended as a priesthood can be felt most:

[the priesthood of science] provides a sort of absolution from responsibility for any controversial matters that may arise in the applications of science. It automatically takes science out of the domain of morality by proclaiming it to be intrinsically moral

Luria (1984: 203)

4.2 SCIENCE AND SOCIAL REFORM

Most scientists think of science as being a kind of purifying intellectual machinery that leads to honesty, to the withering away of ignorance and wrong ideas, including, provided they are of the atheistic persuasion, those of religion. [...]. But the greatest scientists have always looked on scientific materialism as a kind of religion, as a mythology

E.O. Wilson (in Weintraub 1984: 231)

Modern science has as its goal the least pain and the longest life possible – that is a kind of eternal happiness: to be sure a very modest kind in comparison with the promises of religion

Frederich Nietzsche (1996, Aphorism 128: 89)

The idea of genetic therapy has its roots in pre-World War II futurism and eugenics. The first suggestion for the genetic alteration of people for both social and medical reasons can be found in the writings of scientists such as Haldane and Muller ... Early advocates of the technology drew on Jacques Loeb's concept of "biological engineering" as a means of modifying man and combating the degeneration of the race

Paul A. Martin (in Conrad & Gabe 1999: 18)

In a lucid and well-argued autobiography, geneticist Jon Beckwith (2002) argues that a likely explanation for the participation of left-wing scientists in the eugenics movement is that they came from upper-class families. My guess is he refers to J. B. S. Haldane who once claimed that

So long as we are biologists we are considering men as animals. The biologist should not try to do the work of the psychologist, economist, or sociologist. He can very frequently tell them where they are wrong. He must not try to tell them where they are right

Haldane (1928: 175)

What Beckwith does not seem to realise is that several eugenicists happened to be pragmatic idealists like him and what led them astray was their commitment to straighten the "crooked timber of mankind" (Kant 1784).

This was indeed an age-old propensity. In 1802, when Gottfried Reinhold Treviranus coined the term *Biologie* so as to designate the science that would study under which conditions and according to which laws life exists, biologists were meant to be *scientifically trained, activist physicians and chief agents in spreading knowledge useful for economic and social improvement, thereby preparing the ground for the gradual emergence of a just society* (Lenoir in Cunningham & Jardine 1990). In 1869 the preface to biologist Friedrich Ratzel's handbook of natural history stated that the aim of the author was to propagate "progressive tendencies" (Kelly 1981: 22)

In fact, it has been argued that it is typical of older scientists to get entangled in activities of social advocacy more or less related to their professional expertise (Sindermann 1985). Gradually pulling out from pure research but still enjoying a great amount of admiration and credibility, they are led to become spokespeople and seek to shed light on matters concerning the public at large. Thus for instance Jonathan S. Singer (Singer 2001: XV) dedicates his book to the future generations of researchers explaining that ever since he undertook his career, science has been his consuming passion but now that he has reached the age of 60 something has occurred to him:

I began for the first time to think seriously about things beyond the classroom and laboratory. From having been only casually conscious of the human condition, I became keenly interested in trying to understand it. Because my predilections were still scientific, I wanted particularly to explore what the new knowledge of biology and the other sciences might contribute to my comprehension of the world and its affairs

The flip side of the coin is that the temptation may become irresistible, to poach on other professionals' preserves and lose objectivity, developing the so-called Messiah complex, also known as scientific messianism, namely a sort of megalomaniac proclivity to pontificate on broader social issues (Medawar 1979).

Whether this is true or not, and the evidence is too scant to answer this question with finality, the fact remains that, historically, social engagement, political consciousness and utopianism intermingled with utilitarianism and class-prejudices to turn eugenics into a means of domination and eventually annihilation (Deichmann 2000)⁹²:

there were undoubtedly many who subscribed to these schools for purely cynical reasons of personal advancement, but of far greater interest are those (often able scientists) who evidently perceived an intellectual imperative in such bizarre and pernicious doctrines

Gratzer 2000: 309

In order to better understand this issue, I should like to briefly illustrate the ideological and existential trajectory of a Lebensreform commune located in the Italian speaking canton Ticino, near Ascona, quite a scenic tourist-resort. I am referring to Monte Verità, a utopian colony founded in 1899 by a number of nonconformist thinkers who pledged to combat modern malaise by showing the world a new way of life centred on a peculiar form of world-renouncing socialism, featuring mystical and matriarchal rituals, nudism, vegetarianism, and homeopathy. This commune was to become one of the most inspiring experimentations with Lebensreform in the world (paralleled by Taormina and Capri in Italy) and was visited by a number of prominent public figures such as German physician Franz Hartmann, D.H. Lawrence, Franz Kafka, Hermann Hesse, Rudolph Steiner, and Bakunin. One of its leaders was German psychoanalyst and pioneer of the anti-psychiatry movement Otto Gross, whose father Hans Gross was, ironically, a Nazi ante-litteram. In 1905 Hans Gross published a criminological essay entitled "Degeneration und Deportation" arguing that all degenerates should be deported so as to save society (Green 1986: 180):

the tramp, the revolutionary, the habitual thief, the pederast, these cannot be either dissuaded or cured. It's society's fault; it's culture curse on civilization. The processes of culture reverse those of nature, by fostering and propagating the weaker types. So we must remove them from culture – from society. Send them to the colonies for life

Perhaps as a reaction against paternal bigotry and narrow-mindedness, Otto became instead a truly progressive intellectual. Problems arose when the progressive tendencies that have fashioned the commune he founded, started clashing with deeply-ingrained reactionary inclinations. For instance, the whole project was meant to be a return to an idyllic state of nature that was being threatened by the Americanisation of German society, namely by individualisation, fragmentation and greed. But these were also cornerstones of the Nazi ideology. By the same token, their pursuit of a pagan and thoroughly naturalistic religious life promoting man as a demi-god was to be another cardinal element of the *völkisch* spirituality of National Socialism. In the end, one of the founders, Rudolf Laban, became a sympathiser of the Nazis and deprecated the africanisation, i.e. degeneration, of dance, while Alma Drews, another member of this commune, wrote in *Die Tat*, Monte Verità's periodical, that as Christians gather round the cross symbol, so the Asconans should gather under the swastika (Green 1986). Monte Verità remains an instructive instance of idealistic protest run astray due to powerful internal contradictions, unrestrained elitism, and a yearning for unconstrained freedom. Fin-de-siècle despair really existed for those who had enough leisure to ponder their existence, and the outbreak of the WWI was really welcomed with a sigh of relief by the Europeans bourgeoisie, frayed by decades of directionless passions (Lacquer 1962).

The Lebensreform phenomenon intensely affected science as well. One of the most instructive instances of the aforementioned juxtaposition of technical and legitimate knowledge on the one hand and occult knowledge on the other involves a German biomedical scientist, Alfred Ploetz (1860-1940), who orbited in the Lebensreform galaxy and ended up approving of Nazi racial policies, and a German-born Jewish biologist, Jacques Loeb (1859-1924), who met Ploetz in Zurich, and afterwards inexorably drifted towards the most radical form of biological engineering, i.e. the creation of life in the laboratory⁹³. Loeb was never a eugenicist but he, like most eugenicists, demanded that sexual reproduction be duly

⁹² Nature 405, 739; 2000

⁹³ and one of those features of modernity that Weber would have found most ominous

disciplined as any other social activity (David King 1998). As it has been put by Adolphe Pinard, a French eugenicist (Drouard 1992: 446):

Jusqu'à présent l'acte procréateur n'a été qu'un acte instinctif tel qu'il existait à l'âge des cavernes. C'est le seul de nos instincts n'ayant pas été civilisé. [...] Je pense, qu'une évolution ou une révolution s'impose à bref délai

Both Ploetz and Loeb were undoubtedly the ideological heirs of those Enlightenment theorists who urged a centralised control over life and reproduction (see chapter 1). But the immense difference in their approach to the social application of scientific discoveries bespeaks the multifarious nature of eugenics and Lebensreform thought.

Besides reading the works of Darwin, Malthus, Rousseau, Schopenhauer, and Felix Dahn, as an adolescent concerned about the social repercussions of the German *Gründerkrise*⁹⁴, Ploetz pursued an educational training in political economy as he felt that economics could be the key to resolve modernity's contradictions. The entire 1890 generation actually sought to merge the study of biology with those of economics – giving rise to a new academic domain called human economics – for those were the disciplines that held out promises of actual and successful social reforms (Repp 2000). Ploetz was no exception. He had founded and presided an association of young idealists called “Pacific” which was meant to be the point of departure for a major socialist pan-Germanic colony in North America structured after the French socialist Icarian communes already established in Iowa. The ultimate purpose of that commune was to become the groundwork for a *vollständigen Umwandlung der menschlichen Gesellschaft*, a thorough transformation of human society (Kappeler 2000: 139), and for the glorification of the German race and civilization (Faith-Weiss 1987). But in 1884, on discovering that those communes were disbanding, he became persuaded that

daß mit dem heutigen durchschnittlichen Menschenmaterial der Zusammenhalt solcher Kolonien, besonders solcher mit größerer individueller Freiheit nicht aufrecht zu erhalten wäre

[with the average human material of the present it would be impossible to hold together such colonies, particularly those with greater individual freedom]

Drechsel (1993: 104)

Like Cabanis, he conjectured that biological inequalities trammel social equality (Simonnot 1999), and that public hygiene should outweigh individual hygiene (Reyer 1991). That realisation turned him away from the study of economics. Thus he undertook the study of medicine at the university of Zurich in the 1890s, where he met Loeb while attending the meetings of an intellectual circle called “Young Germany”, which promoted socialist and modernist ideals (Pauly 1987). These young German intellectuals had convened in Zurich as a result of the laws that forbade the existence of a socialist party in Germany and prodded each other to seek a way to blend socialism and Darwinism and in so doing solve the European social and spiritual crisis. One of the members of this intellectual circle was Swiss psychiatrist and neurologist August Forel, a eugenicist ante-litteram, who was to permanently influence Ploetz's utopian vision (Faith-Weiss 1987) when he persuaded him to do an internship under his supervision at the neurological clinic Burghölzli. During one of those meetings Loeb met his future wife, Anne Leonard, an American student in Zurich. Afterwards he followed her to the United States, where he would become one of the most popular and respected scientists (Weß 1989). Alfred Ploetz's American experience could not have been more dissimilar. His medical practicing in Springfield, taught him that curing was a Sisyphean toil as opposed to the efficient and permanent effects of prevention (Faith-Weiss 1987). As a result he abandoned the United States and relinquished moderation in his goals and in the means to achieve those goals. The same revelation stroke the other founder of German racial hygiene, Schallmayer, who grew bitterly distressed during an internship at the psychiatric clinic of Munich's university hospital (Faith-Weiss 1987). Eventually, like Cabanis before (Simonnot 1999), they both agreed that biological inequalities trammelled social equality, and moved closer to biologism.

⁹⁴ a major economic crisis afflicting fin-de-siècle Germany

In those years Loeb was elaborating his own scientific method, which privileged experimentation and manipulation over theorisation. His conception of biology was premised on mechanistic materialism – a stance that in the end drove asunder Ploetz and Loeb –, the belief that science was not a worldview but a means to change the world by engineering it to the extent that it could finally resemble the artificiality of a laboratory (Pauly 1987). Having befriended with American geneticist Thomas Hunt Morgan, he gradually spread reductionism and experimentalism across an academic milieu that was charmed by such a novel approach to evolutionary processes (Weß 1989). Emboldened by their successes, Morgan and Loeb eventually resolved to found a new, “American” biology, modelled after American progressivism and its emphasis on progress, experimentalism and mechanism. In other words, for all his open-mindedness and civic engagement, Loeb became the quintessential promoter of a sanitised and technocratic form of bureaucratic rationality.

Instead Ploetz ended up favouring a less bio-technologically oriented but way more invasive and illiberal intervention on society. His goal was to contrast any social reform that did not involve selective breeding as part and parcel of a humanitarian and socialist policy (Repp 2000) and this drove him to embrace race hygiene, natural religion and, eventually, national socialism. For all his profession of progressivism, that of Ploetz was rather another instance of modernized conservatism as he strove to preserve the traditional conceptions of motherhood and family and blended them with a romantic idealization of rural life and the fatherland (Mocek 2002).

In 1895 he published a paper entitled “Die Tüchtigkeit unserer Rasse und der Schutz der Schwachen”⁹⁵ where he explained that the humanitarian and socialist ideals inspiring the state’s measures for the protection of the weak run against the interest of the Volk and of the race (Weingart 1987). He then advanced the project of a *rasseygienische Utopie* grounded upon the key-notion that in a utopian eugenic-oriented society reproduction could not be left to chance and a panel of doctors would judge over the life and death of unfit children (Kappeler 2000). Below are the prerequisites that Ploetz envisioned for such a society to function (Sieferle, 1989: 96):

- Elimination of abnormal newborn children;
- Killing of twins and of all children who are more likely than the average to be hereditarily abnormal;
- Classification of people according to a scale determining their entitlement to reproduce;
- Neglect of the genetically sick and the constitutionally weak so as to prevent their reproduction;
- Meticulous birth-planning;
- Abstention from smoking and alcoholics;
- In case of war the weakest subjects should be used as cannon-fodder.

It is hard to believe it but Ploetz was actually a candidate for the Nobel peace prize as one of the chief exponents of the eugenics’ peace movement, arisen in response to eugenicists’ preoccupations for the severe dysgenic effects of war (Kühl in Szöllösy-Janze 2001). These atypical “peace activists” held that an ideal community of healthy people would inevitably pursue peaceful means to compose their quarrels. However, they also believed that, should a war break out, the unfit would be “sacrificed” in order to offset the counter-selection operated by warfare. Unsurprisingly, then,

the contrast between their utopian vision of a eugenic peace order of superior human beings and the devastating results of the Second World War made them completely immune to moral scruples about the killing of mentally handicapped people

Stefan Kühl (ibidem: 204)

Jacques Loeb was a strongly committed pacifist, but he never advocated eugenics and Nazi “intellectual” Alfred Rosenberg attacked his mechanistic scientific worldview (Harrington 1996). Gradually, though, it occurred to him that his dreams of social control and biological engineering of desirable social traits – through artificial parthenogenesis – were not likely to come true within his lifetime and became depressed (Rasmussen & Tilman 1998). The baton was passed on to his

⁹⁵ The fitness of our race and the protection of the weak

most faithful and most brilliant American disciples, namely biochemist Gregory Pincus and geneticist H.J. Muller (1890-1967). Pincus was the father of the modern contraceptive pill. This contraceptive technology was developed in response to a growing desire for smaller families (Usborne 1992), but could also be used to curb the reproductive rate of the lower classes.

Hermann Joseph Muller's German grandparents have migrated to the United States after the 1848 failed revolution and had settled down in New York (Weß 1989). In line with his ideological background, after enrolling at Columbia University, he joined an association of socialist students and divided his reading-time between socialism and biology, especially Loeb's "Dynamics of living matter" that prefigured the total control of evolution and social processes (Weß 1989). In 1910, when he was 20, he exhibited a mindset that little differed from that of Ploetz at the time of his studies in Zurich. This is what he wrote in an unpublished manuscript entitled "Revelation of Biology and Their Significance" (March 24, 1910; Carlson 1981: 35):

I reach the conclusion that we should not only check degeneration — negatively — but further evolution...and work positively for the production of a nobler and nobler race of beings. Those will become supreme who not only care for those now living, but include, as it were, in the social organization, the remotest future, by applying the principles of heredity and variation. [...]. Mankind has nothing real to lose, but only to gain, by a process of evolution...Only tradition is opposed to this plan, and our own stupidity and defective social nature

We can certainly impute to his political leanings his ambivalent attitude to the eugenics of that period that had a propensity to disparage immigrants, blacks and proletarians in general. He went so far as to publicly denounce in 1932 the elitist and racist strands of eugenics (Carlson 1981). By contrast, he self-righteously contended that (Muller 1935: 44)

There is no chance that the mighty wheel of true eugenics could be set into motion, and then moved effectively in the really up-hill direction, except by a people thoroughly socially-minded, one willing to sacrifice something of the present for a far-seen common ideal

Muller was more inclined to identify eugenics with the attainment of human control of evolution by separating sexual intercourse from reproduction and bringing the latter into the laboratory (Pauly 1987). Given that the USSR was at the forefront as concerns scientific planning and human experimentation on a large scale, it is all but natural that he would spend there a few years seeking to "eugenicize" Russian communism.

Another communist eugenicist was British biochemist J. B. S. Haldane (1892–1964). In 1923 he published an essay titled *Daedalus, or Science and the Future*, which inspired Aldous Huxley's frightening novel "Brave New World" (Pauly 1987). "Daedalus" described biologists as the *most romantic figure on earth at the present day* (1925: 77), for many are dreamers in pragmatic disguise and their dream is the attainment of human happiness. In 1948 biochemist Joseph Needham echoed his views contending that the essence and purpose of pure science is *to make the whole of human society holy* (1948: 120)⁹⁶. Thus from its inception biology was conceived of as a discipline that would commit activist scientists to a master plan of redemption and social enhancement and the life-sciences in general have proven susceptible to "romantic contagion" (Richards in Cunningham & Jardine 1990)⁹⁷. One of the cardinal hypotheses of my thesis is that the practitioners of the life-sciences are more likely than those of other scientific fields to display some of the attributes of Romantic thought (H.G. Schenk 1979: XXII)⁹⁸:

Contradictoriness, dissonance, inner conflict; utopian dreams for the future side by side with nostalgia or the past; a marked nihilistic mood accompanied by a fervent yearning for a faith

This may constitute a problem. In 1924, Bertrand Russell responded to Haldane's *Daedalus* with his *Icarus, or the Future of Science* objecting that science is liable to be subjugated to the power of dominant groups and that the more advanced science becomes the more easily they can realise their purposes. This is actually a process that has been intensified by the

⁹⁶ Notably, besides being celebrated scientists, Haldane and Needham were fervent eugenicists.

⁹⁷ This penchant somehow echoes Francis Bacon's visionary understanding of the nature of science with its predominant concern for a radical material improvement of human life and the eventual domination of man over nature.

⁹⁸ Bio-scientists are NOT prone to such inclinations but simply apter than, say, geologists or chemists, to develop them because the study of biology heavily bears on the conception of what is human.

growing direct applications of science to the transformation of our environment and to our own modification (Tambiah 1990). However, Haldane continued undaunted to preach his techno-scientific credo (Adams 2000):

In various writings, he expressed admiration for the transcendence and self-sacrifice of the Christian saints, and his own behavior consistently reflected the same commitment – in his indifference to his own scientific priority, his defense of the meek against the powerful, his devotion to social and political causes, and his evangelical “popularizations,” not to mention his lifelong willingness to conduct dangerous experiments on himself for the greater good.

It has been argued that scientists’ obsession with absolute objectivity, which caused them to embrace an ascetic, stoic self-discipline aimed at self-purification and at times, as I could witness myself, bordering on self-abnegation (Daston & Galison 1992), has something to do with the Protestant background of many pioneers of modern science (Merton and Webster in Cohen 1990; Weber 2000)⁹⁹. In keeping with these sentiments, Thomas Hobbes in the *Leviathan* defined curiosity, the cardinal virtue of a scientist, as *a lust of the mind, that by a perseverance of delight in the continued and indefatigable generation of knowledge, exceedeth the short vehemence of any carnal pleasure* (cited by Temkin 1969: 430). By the same token, with Locke is no longer pleasure to guide the researcher but love of the truth, the kind of love that calls for sacrifices and abnegation (Temkin, *ibidem*). Perhaps Charles A. Winter (1970: 29) is correct in arguing that

The scientific approach... is the most liberated state of mind known short of drug-induced anarchy

Similarly, Jean Rostand (Rostand 1956) believed that the love of truth of scientists is a force whose intensity and sway are nearly indescribable and that scientists confront these feelings with the attitude of a worshipper or a fanatic.

Finally, the view of humankind as a cosmic agent entrusted with the task of perfecting the Creation originated immediately before and during the French revolutionary years. Condorcet’s words exemplify the correlation between French revolutionary science and progressivist eugenics (in Nicole and Jean Dhombres 1989):

Si ce perfectionnement indéfini de notre espèce est, comme je le crois, une loi générale de la nature, l’homme ne doit plus se regarder comme un être borné à une existence passagère et isolée, destiné à s’évanouir après une alternative de bonheur et de malheur pour lui-même... ; il devient une partie active du grand tout et le coopérateur d’un ouvrage éternel

This mode of thought was not in the least new. Francis Bacon had already envisioned an elitist association of scientists devoted to the restoration of man’s dominion over the Creation. In his utopian work “the New Atlantis” (1627), depicting an ideal society run by a college of scientists, Bacon has a senior fellow of Salomon’s House state that (Isaacs 1987):

The end of our Foundation is the knowledge of causes and secret notions of things; and the enlarging of the bounds of Human Empire, to the effecting of all things possible

The rationale underlying this project was very conservative, though. It all came down to the assumption that scientific progress would turn out beneficial to both the ethical and social sphere – for him truth and utility were the same thing – and will preserve the order by alleviating the distress of the poor and the sick. In other words, social conservatism would be buttressed by incessant scientific innovation obviating the necessity to effect any alteration of the social structure (Isaacs *ibidem*). Functioning as the political arm of genetics (Medawar & Medawar 1977), eugenics became a prop for elitist hegemony by pointing to naturally grounded power-relations (Zoloth-Dorfman in Peters 1998; Giove 2001). Eugenicians pontificated on matters of freedom and bare existence (Labisch 1992; Colla 2000) and legitimated their illiberal posture through a considerable amount of idealism, utopianism, and even paranormal beliefs (Burrow 2000). Paradoxically, the more a scientific worldview¹⁰⁰ disenchanting human relations, the more it was endowed with mystical attributes (Burrow 2000). Like their precursors, physiognomicists and phrenologists, the former studying facial somatic traits and the latter studying

⁹⁹ These are for Merton (*ibidem*) the hallmarks of Puritanism that may have influenced the emergence of science: utilitarianism, intramundane interests, methodical approach, empiricism, anti-traditionalism. For Weber monotheistic Puritanism was at the core of that orderly rationality without which science could not have been possible.

¹⁰⁰ *Like all academics, I wanted my professional life to have meaning and significance, so I naturally began applying biology to everyday life* (Vandermeer 1996: XIV)

the shape of skulls, who pretended they could prove the connection of physical looks with moral proclivities and intellectual capacities (*kalokagathia*), more than a few eugenicists were influenced by Rosicrucianism, freemasonry, kabala, gnosticism, and racist occultism (Burrow 2000), a discovery that has compelled me to devote the next chapter to a close examination of this intriguing finding.

4.3 EUGENICS AS A NEW RELIGION

Scientists are Utopian by temperament

P.B. Medawar (1990)

I take eugenics very seriously, feeling that its principles ought to become one of the dominant motives in a civilised nation, much as if they were one of its religious tenets

Francis Galton (Memories 322; cited in Gillham 2001: 324)

What frightens me about Muller and to some extent Huxley is their extreme self-confidence, their complete conviction not only that they know what ends are desirable but also that they know how to achieve them

Medawar (in Wolsenholme 1963: 296)

R.J. Lifton (1986; 1990; 1999) has sought to find an answer to the question of what is about German and Japanese doctors that enabled them to become instrumental to the execution of Hitler's and Asahara's deadly plans and to kill in order to heal. He has described several factors that may have triggered such dehumanizing process:

- A sense of belonging to an oppositional subculture transcending the ordinary – which we already encountered among many students of biomedical sciences in late Nineteenth- and early Twentieth-century Germany;
- The sacralisation of science and a parallel scientific approach to collective salvation – something that had already been developed by English puritan scientists (Pyenson & Sheets-Pyenson 1999);
- A profound anxiety about the future issuing in an apocalyptic fixation together with the rejection of all present social institutions, norms and values and the aspiration to a global renewal, feelings that fed upon each other in a fatal vicious circle – which resembles the climate of despair typifying fin-de-siècle Europe;
- The subordination of individual welfare to the communal good and individual freedom to a totalitarian doctrine – the core of the Nazi approach to the biomedical practice¹⁰¹;
- A functional megalomania reinforcing the conviction that they possessed the absolute truth – unfortunately an all too common persuasion amongst leading eugenicists

All of the above can be found in the eugenic movement as well. Eugenics started as an oppositional subculture but, being the expression of elitist beliefs, it became a household term for numerous middle and upper class professionals (Searle in Webster 1981; Macnicol in Gabbay & Webster 1983; Brown 1988). Nevertheless, it still retained its minority characteristics, given that the representation of the business community and of the political and administrative sphere was disproportionately low (Brown 1988), probably because the members of most eugenics societies faulted politics and unbridled capitalism for bringing about social decay – eugenicists repudiated capitalist materialism but upheld scientific

¹⁰¹ Incidentally, Ute Deichmann (1996) has proven that freedom of research does not depend on peace and democracy. In point of fact Nazi and AUM scientists enjoyed a considerable leeway within the scope set for them by their patrons

materialism as the only feasible response to the social question – and because entrepreneurs did not need an ideological springboard.

This ideological positioning did not avert mystical and vitalist forays. This was particularly true in Germany, where from the 1870s onwards bourgeois conventions were being questioned by the young generations who chose to flee to the countryside in an escapist rejection of materialism (Mosse 1988) and founded youth associations precisely in order to arrest the materialist shift of German society which was identified with Jewish liberalism and Jewish experimental science (Mosse 1964, 1978; Harrington 1996). An attitude best portrayed Bazarov (Turgenev, "Fathers and Sons", 1865), who cultivated a blunt, materialist and utilitarian realism and rejection of convention to the point of brutality, while retaining a humane dedication to healing the sick (Burrow 2000: 9). Thus history teaches us that both extremes in science – materialistic, deterministic reductionism and vitalist teleologism – are equally potentially harmful.

Interestingly, neither is completely immune from some measure of religiousness. Parrinder (1995) notes that reductionistic and materialistic scientists and socialist eugenicists such as Bernal and Haldane manifested the same reluctance to accept the materialistic character of modern democracy – the same which was also criticised by Max Weber and Michel Foucault – and invoked a more pronounced readiness to sacrifice the individual self-interest for a higher purpose, i.e. the species' welfare. This is all the more intriguing, given that that socialism and eugenics were compatible also by virtue of their materialistic and positivistic premises (Massin 1990). Eugenicists went to great pains to draw an unequivocal distinction between scientific and everyday materialism and sociobiologist E. O. Wilson (Weintraub 1984: 231) is probably correct when he argues that

most scientists think of science as being a kind of purifying intellectual machinery that leads to honesty, to the withering away of ignorance and wrong ideas, including, provided they are of the atheistic persuasion, those of religion. [...] But the greatest scientists have always looked on scientific materialism as a kind of religion, as a mythology

Significantly, the same mélange of reductionism, religious longing, teleologism, utopianism, cosmic pessimism, and the sense of being involved in a cosmic, epochal struggle against obscurantism (Paul 1998), which typified phrenology, eugenics and the life-sciences, and that was much opposed by idealist natural philosophers (Temkin 2002), also permeated the Aum Shinrikyo's worldview (Metraux 2000; Reader 2000). In Japan the same sort of materialism encompassing hyper-rational secularisation, ambition, careerism, hedonism, scientism and Stakhanovism, but devoid of spiritual fulfilment, that was loathed by most eugenicists made possible for a number of promising young scientists to become alienated to such an extent that the only option they could envision was joining a techno-cyber-esoteric sect. In this respect, I believe a more in-depth analysis is necessary, of the connection between science's inbuilt tendency to spawn huge expectations and utopian dreams and its incapacity to deliver. To put it differently, these youths' desire to explore transcendental questions and experiment with superhuman faculties (divination, levitation, extra-sensory perception, etc.) could well be the signal that science for them had just become a tedious activity wanting in stimulating and inspiring factors. But the most intriguing finding is that

Alongside this apparent rejection of science and technology as the overarching gods of a modern, rational, secular and regimented society, there was a ready acceptance of modern technologies and scientific techniques in the service of religious ends. [...] While science as the guiding principle of a materialist society was thus criticised for being unable to answer basic spiritual questions, it was not rejected wholesale but adapted into a wider rubric in which, it was believed, it could serve the interests of the religion of the future rather than oppose it.

Ian Reader (2000: 49)

Most importantly, Aum-Shinri-kyo mainly drew people from the same professional categories fascinated by the eugenics project: doctors, cardiologists, biologists, chemists, lawyers, social scientists, etc. (Lifton 1999; Reader 2000; Murakami 2001). All these upper class, well-off young men had not been intentionally targeted and recruited for their expertise, for Asahara had not planned ahead the apocalyptic turn that his cult would take. They rather spontaneously followed the guru on account of their existential estrangement (Reader 2000). This movement, like phrenology and eugenics,

attracted young, ambitious people who could be or were already successful, but who had also come to believe that the system in which they were making a name for themselves failed to fulfil their true wishes, that were far from material (Reader 2000).

The reader by now is well acquainted with the fact that biological determinism, the belief that individual temperaments and social ills must be imputed to organic malfunctioning; the alleged inheritability of socially dysfunctional traits and the consequent rejection of the principle of human equality on scientific grounds, all played a key role in fomenting an intrinsically anti-democratic eugenic fervour among many bio-scientists. The same psychological and ideological process was at work within AUM. Instead of "germ plasm", the catch-word employed by Asahara and his followers was "karma". Instead of biological decline the threat was spiritual decadence. By living in a sick and corrupted society, the adepts were accumulating bad karma that, like a genetic burden, would affect them for the rest of their life as well as in the other world. This negative influence could only be counteracted by escaping from the bonds of karma through meditation (*karuma kara no dasshutsu*) or, another striking analogy with the eugenic doctrine, by changing those social institutions and conventions that they recognised as the root of all evil (Reader 2000). The analogies with eugenics are patent:

- to positive eugenics corresponded a positive spiritual cleansing through ascetic practices
- to negative eugenics corresponded the annihilations and renewal of Japanese society when Asahara's candidacy to the administrative elections turned into a trouncing defeat

Within Aum we behold the very same scientific utopia of perfect health, fitness and harmony that had been deliberated in Germany and elsewhere in the first half of the Twentieth century and that had arisen concomitantly with the French Revolution. This creed had not been extirpated by the dissemination of democratic ideals in the aftermath of WWI and Asahara is far from a unique, pathological case. One bio-scientist who was fascinated by Ambroise Condorcet's proposal of a medicalized society¹⁰² was Alexis Carrel, 1912 Nobel Prize laureate in physiology and medicine and unfaltering eugenicist. Utterly inept at starting off his juniors' careers (Weisse 1998), Carrel proved to be more talented as a writer. In 1935 he published the worldwide bestseller "L'Homme, cet inconnu" in which, besides revising Condorcet's utopian project of a society guided by an aristocratic council of superior-minded individuals, he urged policy-makers to pass laws in order for certain criminals to be gassed (Carrel 1935: 434-436). Unsurprisingly, he adhered to the pro-nazi Parti Populaire Français during the Vichy interval and prefaced the German edition the above mentioned book by endorsing the "energetic measures" taken by the German government against feeble-minded and criminals calling for the immediate suppression of those individuals who display a tendency to being dangerous. Assuming that the intellectual sterility of contemporary science and the inability of scientists to see big picture had accrued from the fragmentation of science for the sake of specialization, he suggested that medicine, or rather social medicine, was the most suited discipline for the role of liaison among all the other branches of science, due to its comprehensiveness and direct concern for the future of mankind. But medicine had to be transformed from a curative to a governing endeavour in charge of the control of all human organic and reproductive functions in furtherance of a civilizing and enlightening project. Managerial centres modelled after the Pasteur Institute or the Rockefeller foundation would superintend the holistic synthesising of human knowledge and wisdom informing the activities of the executive. The members of these centres, veritable guardians of morality and progress, would be asked to assimilate as much information as possible, ascetically devoting their entire lives to the study of all scientific fields, with no room for love, amusements, politics, and the divulgation of scientific discoveries. These platonic guilds would not suffice, though, without a drastic intervention on the biological make-up of the citizens. Inspiration alone is ineffective if it is not

¹⁰² *Le tentative d'Alexis Carrel de reconstruire l'ordre social, en s'appuyant sur la « Science de l'homme » conçue comme synthèse des disciplines médico-biologiques et des sciences sociales, s'inscrit dans cette perspective, tout en se reliant à des essais plus anciens d'inspiration eugéniste comme ceux de Condorcet, de Cabanis, ou de George Drysdale (Drouard 1992 : 456)*

accompanied by the accentuation through voluntary positive eugenics of class differences that have been erroneously interpreted as historically engendered whereas they are based on a real biological hiatus. A non-hereditary aristocracy would be formed by persuading the youngsters that health-considerations are stronger and more cogent than love-feelings. Women, who deteriorate by practice harmful dietary regimes and refuse to bear children would be returned to their traditional place in society, the household. They would be permitted to receive a higher education not in order to become doctors, lawyers, or professors, but to rear their offspring to be valuable human beings. Certificates of suitability to marry and procreate should be issued only to those who do not exhibit congenital defects. By an appropriate education, everyone could be helped realize what wretchedness is in store for those who marry into families contaminated by syphilis, cancer, tuberculosis, insanity, or feeble-mindedness. Such families should be considered by young people at least as undesirable as the poor ones. In truth, they are more dangerous than gangsters and murderers. No criminal causes so much misery in a human group as the tendency to insanity. This would be extremely fair, in his view, for no human being has the right to bring misery to another human being. Still less, that of procreating children destined to misery. During the fascist period, an Italian commentator, Alberto Mochi, noted that besides revealing an astonishing absence of scientific methodology in the analysis and exposition of facts, Carrel's book contained notions distorted to the point of becoming a caricature, the shadow of all previous utopias (Mochi 1943: 110). What's more, as regards the criteria for the establishment of truth, he remarks the Carrel's suggestions are tantamount to the resumption of the Inquisition, but this time under the aegis of science.

Between the date of publication of his bestseller and his death, occurred in 1944, Carrel amply demonstrated that he was the epitome of the scientist who had let success go to his head. While seeking to put into action the plans he had presented in his writings, he beheld and praised the birth of the fascist brigades Croix de Feu and made public his contempt for that democracy that in France was going through its hardest trial. Democracy, he thought, *il faudrait...le remplacer par un régime plus autoritaire* and the European predicament meant the failure of liberalism, democracy, massonic ideology, mass production and, ultimately, of modern civilization as a whole (Soupault 1951):

La démocratie tue les grandes races lentement, mais sûrement. Un idéal, une foi, une attitude héroïque devant la vie sont indispensables

Carrell (Soupault, ibidem: 197)

Finally he embraced Nazi millenarian expectations:

Il y aura une grande poussée mystique semblable à celle qui précéda l'an mille et qui le suivit. Peut-être cette impulsion, si elle réussit à s'incorporer à la science, sera-t-elle la base d'une civilisation nouvelle...C'est notre seul espoir

Carrell (Soupault, ibidem: 197)

He complained that a total commitment to his profession was no longer satisfactory because biological research does not concern itself with the practical, huge problems afflicting the world. In 1939 he went back to France where, after the defeat and the establishment of the pro-Nazi Vichy Government under general Petain, he took on the task of founding the "Institut de biologie humaine", an old dream coming true. This institute began its activities in 1942 and focussed, among the others, on the *problème de l'enfant* (eugenics) and on the *problème de la mise en valeur des qualités mentales de la population* (presumably sterilisation and euthanasia of the unfit). Carrel died of cardiac arrest on November 5th, 1944 on fleeing French police that were after him for his collaboration with the Nazis and Vichy. I subscribe to the assessment of his most popular work that has been made by J.G. Simmons (2002: 203):

overall, Man, the unknown, reveals a genius at work in the shadow of fascist designs on the world, chiselling emblems of despotism with tools of science.

A British sympathiser of a scientifically administered utopian society was biologist and communist activist J. D. Bernal, something of a hero for politically active scientists (Brownhill & Merricks 2002). He advocated the establishment of an aristocracy of scientists through the hereditary separation into castes of the gifted and the dull (dimorphism). These

experts would efficiently run the world without the masses being aware of that. They would live docilely under the appearance of freedom and all innovations would occur so rapidly that they would be a fait accompli before giving rise to any form of protest. Eventually, the better organized beings would be obliged in self-defence to reduce the numbers of the others, until they are no longer seriously inconvenienced by them (Bernal [1929] 1970: 73).

These scientists are unfortunately no exceptions in an otherwise impressive assortment of high-minded, benevolent, and responsible intellectuals. The Sixties witnessed a new wave of daring conjectures, a sort of secular evangelism furthering the traditional eugenics messianic moral crusade, which brought Leslie C. Dunn (Dunn 1963) to remark that their authors manifested the same benevolent utopianism of Galton¹⁰³ and that, although ill-advised, their suggestions would likely be uncritically accepted due to the authoritativeness of their proponents. As to the utopian nature of these formulations, there is a remarkable consonance between renewed eugenic discourse and views on cosmic evolution that Pierre Teilhard de Chardin had popularised through his writings (Chardin 1955). Virtually all eugenicists from Huxley to Haldane, and from Muller to Crick, appeared to have shared the belief that science was the doorway to utopia. The source of their utopian inspiration, in lieu of More, Plato, or Campanella, is nowadays unmistakably Pierre Teilhard de Chardin. References to this Jesuit polymath can be found in the theories of several scientists with a eugenics bent such as Julian Huxley (1947; 1964)¹⁰⁴, René Dubos (1962), W. H. Thorpe (1965), A.E. Wilder Smith (1968), and Feinberg (1969). Louise Young's anthology of essays in biology (1970) is essentially a tribute to Teilhard de Chardin.

The problem with utopianism may well be that its upholders are structurally blind to compromises, negotiations, and moderation. Apocalyptic prophecies, now focussing on both environmental deterioration and social disruption, continue to nurture vain hopes that the key to all contemporary plights lies in our genetic enhancement. Emblematic in this sense is Gregory Stock's portrait of a sadomasochistic future society – a veritable Brave New World – in which reprogenetics will create genetically in-built professional specialisations, more dependable “gender specificities”, and the reinforcement of those values that a specific society may privilege, such as *calmness, obedience, and curiosity* (Stock 2002: 194).

The words employed by Bernal in his frightening scenario were not dissimilar (Bernal [1929] 1970: 69):

psychological and physiological discoveries will give the ruling powers the means of directing the masses in harmless occupations and of maintaining a perfect docility under the appearance of perfect freedom. But this cannot happen unless the ruling powers are the scientists themselves

Calmness, obedience, docility are recurring terms in scientific utopias and we should wonder whether by any chance the regimented, hierarchical, orderly and aseptic laboratory environment has anything to do with this longing for tidiness and compliance. For instance, besides “salvation” the other concept that subtly and surreptitiously pervades the new eugenic discourse is “harmony”. *I don't want harmony, for love of mankind I don't want it*, Fëdor Michajlovič Dostoevskij has Ivan Karamazov say against a clear example of subordination of the interest of the individual to the wellbeing of the “collective”.

Our duty is to decry and combat dystopian visions such as Gregory Stock's portrait of a sadomasochistic future society – a veritable Brave New World – in which reprogenetics would create genetically in-built professional specialisations, more dependable “gender specificities”, and the reinforcement of those values that a specific society may privilege, such as *calmness, obedience, and curiosity* (Stock 2002: 194). Such nightmarish visions can only scare people or entice unscrupulous politicians. Incidentally, eugenicist Frederick Osborn (1937: 393) urged that eugenics pursue pretty much the same goals: the development of a *balanced personality and normal attitudes toward family life*. Similarly offensive is James Watson's lack of qualms in minimising the importance of demanding consensus from the public opinion because *it is none of their business. If there's a terrible misuse and people are dying, then you can pass regulations*

¹⁰³ As to Galton's reported benign brand of utopianism, Dunn should have at the very least mentioned that in his utopian essay Kantsaywhere Galton portrayed an imaginary society in which the inhabitants would be required to pass a test of genetic fitness and the unfit would be confined to labour colonies where they would be forbidden to procreate. (Gillham 2001: 2)

¹⁰⁴ who also wrote a laudatory preface to the English translation of *Le phénomène humain* (1955)

(Stock & Campbell 2000: 84). Such statements demonstrate once more that scientists do tend to be liberal or radical in politics (Hirsch 1968), perhaps because scientific reductionism inevitably appears radical (Appleyard 1998)¹⁰⁵.

My respondents repeatedly stressed that their individual actions and temperaments were expected to harmonize with the aims of the laboratory, metaphorically converted into a human beehive, with very little room for deviation and dissonance. In this respect, I find exceedingly instructive the comments that several scientists sent to *Physics Today* (1981) after reading Nader's forthright analysis of the data she collected on the impressions that experts in nuclear energy at Lawrence Livermore Laboratory had formed about their research practices (Nader 1996). Some of those comments confirmed her impressions and even strengthened the evidence she had collected.

In her article on *Physics Today* she argued that controlling processes lie at the foundation of the "harmony ideology". These strategies have much in common: emphasis on conciliation, meekness, passivity, reluctance to take issues with the authority, and so forth. It turned out that scientists are not exempt from the standardising effects of the harmony ideology and display the following characteristics:

- An inclination to group-think and conformity, plus sanctioning of deviancies;
- A preference for abstract over concrete thinking;
- A number of solid religious-like beliefs such as "progress is equal to growth", "societies only change from the top down", "technological fixes can solve human problems and forestall crises".

Some of those who read her analysis wholeheartedly agreed with it and commented that as researchers are nowadays faceless, they cannot feel particularly responsible¹⁰⁶. Others that growth was the American religion and *a religion is something you accept without subjecting it to analytical scrutiny* (266). Nader remarked the high number of replies that reported episodes of censorship, absence of dissent, and coercion. The chair of a physics department admitted (267) the great frequency of bullying, silencing, professional ostracism, and machismo. A distinguished physicist and engineer described how he compared *the attitude of physicists and engineers to cowboys* (268) and a senior physicist pointed out that data and number rationalized different social and personal values (269). Nader comments that *both hierarchy and bureaucracy seem to get in the way of frank and open expression*, but she could have dwelled some more on the psycho-sexual implications of the evidence she gathered. For instance, does it appear likely that analogous attitudes would be detected in a laboratory where the majority of researchers are women? At no time did my female respondents mention any forms of harassment, nor did they feel that machismo was widespread in their laboratories. In the main they were on good terms with their colleagues and their only anxiety arose from the power conflict involving their seniors. Thus it would be interesting to take a closer look at how the behaviour of scientists, both male and female, changes in relation to the growing pressure, responsibility and competition.

Let me conclude this chapter with a suggestion. I suspect the relationship between the attitude of alchemists towards their opus and that of scientists towards their own research project should be methodically explored. It seems to me that the analysis by C.G. Jung (Jung 1953a; 1953b) of the alchemists' mindscape and of the all-important role played by their subconscious in their quest is worthy of the utmost attention. One similitude lies in the perception of alchemy and science as a way of life; another in the kind of psychological changes taking place inside the inquisitive researcher; and, last but not least, in the religious satisfaction experienced by both the alchemist and the scientist (Dobbs 1975)¹⁰⁷.

¹⁰⁵ *The outcome of the scientific approach is to depreciate man. Astronomy proclaims his microcosmic size. Biology claims that he had animals, if not for parents, at least for first cousins, in the long evolutionary series. Chemistry affirms that he is a compound of hydrogen, oxygen, carbon, and other elements, of the same essential stuff as sticks and stones.[...]. If we add to the theoretical degradation of science the fact that it has supplied the weapons whereby the human race can be liquidated, the indignity is complete* (Francis Ensley in Utke 1978: 190)

¹⁰⁶ this mechanism is termed "diffusion of responsibility"

¹⁰⁷ Significantly, as far as I was given to understand, at least two of my respondents were keenly interested in the history and practice of alchemy and derived existential (and perhaps professional) insights from the perusal of the relevant literature.

A parallel line of inquiry could look closely at the mystical tinges of AI research, given that three of its “founding fathers”, namely von Neumann, Wiener, and Minsky claimed to descend from Rabbi Low of Prague (Noble 1999)

5. SCIENCE, DEVIANCE, AND THE REVULSION FROM COMMON HUMANITY

It seems to me that laboratory reproduction is radically human compared to conception by ordinary heterosexual intercourse. It is willed, chosen, purposed, and controlled, and surely these are among the traits that distinguish Homo sapiens from others in the animal world...Coital reproduction is therefore less human than laboratory reproduction

Joseph Fletcher (Carney 1980: 152)

The logical outcome of activities in modifying the genetic make-up of man is to reach the stage where couples will want their children to have the best possible genes. Sexual reproduction will be virtually ended. One suggestion has been to remove genetic material from each individual immediately after birth and then promptly sterilize that individual. During the individual's lifetime, record would be kept of accomplishments and characteristics. After the individual's death, a committee decides if the accomplishments are worthy of procreation into other individuals. If so, genetic material would be removed from the depository and stimulated to clone a new individual. If the committee decides the genetic material is unworthy of procreation it is destroyed...The question is indeed not a moral one but a temporal one – when do we start?

Molecular biologist James Bonner (in Cavalieri 1981, 153)

I'm very afraid of the middle class deciding what's best for poor and unfortunate people. I think they're patronizing, and they distrust the notion of trying to improve human beings, because they think they're pretty well off. In reality, they're not really worrying about the people who suffer from what I call "genetic injustice"

James D. Watson (Stock & Campbell 2000: 78)

We are witnessing the erosion, perhaps the final erosion, of the idea of man as something splendid or divine, and its replacement with a view that sees man, no less than nature, simply as more raw material for manipulation and homogenisation. Hence, our peculiar moral crisis

Leon R. Kass (1985: 37)

The Lebensreform movement arose from the Enlightenment aspiration to a better life through the pursuit of liberty and happiness, as well as from the Romantic return to nature as a panacea for the ills of modern life. In Germany, the channelling of the protest of the young against the bourgeois hypocrisy of previous generations into nationalism and racial thought completely subverted the initial progressive and utopian enthusiasms of the very popular Lebensreform movement that had gone hand in hand with the women's emancipation movement.

The purpose of this chapter is to illustrate what happened, and why the trajectory of the Lebensreform movement should be taken as a cautionary tale. This chapter will also explore some of the most problematic issues concerning the practice of genetic counselling and the utilitarian turn in contemporary bioethics. The common denominator is that the way the notions of "bare life", "deviance", and "relief of human estate" have been recast since the last decade of the 19th century, also thanks to scientists' public stances, indicates that the chief questions we should address in the genomic era cannot possibly be formulated exclusively in philosophical terms. There are too many scholars involved in the project of the redefinition of bioethics in the genomic era who employ the taboo words "National Socialism" only to stifle debate between promoters and critics. It is facile to reduce the wealth of insights and teachings we may derive from a historical analysis of the relationship between ethics and science to the dogma of the "Nazi slippery slope". If anything, the slippery slope commenced well before under more favourable auspices, and the issue is far more complex than a mere confrontation between short-sighted advocates of genomics and apocalyptic detractors. I hope this chapter will help the readers appreciate the depth of the problem we are facing.

In late nineteenth-century Switzerland – particularly in Zurich, a veritable refuge for dissident intellectuals and home to one of the very few universities that welcomed female students –, and in several sanatoriums all across Europe experimenting with Lebensreform, some of those biomedical students who were to become foremost eugenicists and racial

hygienists in Weimar and Nazi Germany¹⁰⁸ –, keenly read the works of Plato, More, and Campanella portraying utopian eugenic societies (Weindling 1989), and so did Dr. Ernst B., a would-be Auschwitz physician (Lifton 1986). There actually took place a “virtual epidemics of utopianism” (Weindling 1989), probably fomented by a keen sense of meaninglessness following the “Death of God” (Martin 1996), and characterised by (Weindling 1989; Burrow 2000):

- an awareness that universities were training more graduate students than they could absorb, and that a permanent appointment was a forlorn hope;
- a millenarian, apocalyptic sense that a great transformation was looming;
- a messianic belief that they, as scientists, could and were morally obliged to accelerate its occurrence;
- a deep-seated hatred for consumerism, commercialism, and profit-oriented practices leading some to embrace the most trite anti-Semitic stereotypes;
- a strong intolerance of the Christian doctrine of other-worldly compensation and consolation which implied meekness, passivity, and fatalism in everyday life;
- the sentiment that a thorough lifestyle-reform was necessary in order to attain mankind’s biological salvation and free the world from misery and disease;
- the accompanying *Freikörperkultur*, a blueprint for the future Nazification of German everyday life, which would involve a cult of the healthy body and an ostensibly edifying self-restraint premised on vegetarianism and total abstinence from alcohol and tobacco (Massin 1990)¹⁰⁹.

This movement was named *Lebensreform* that is, life-reform, and involved the campaign against alcoholism and venereal diseases, and for the amelioration of the working class’s living standards, dietary reform, and environmental protection. Those associations championing *Lebensreform* also pressed for a more interventionist State as regards public health, social hygiene, and disease prevention (Ehrenström 1993). Emblematically, two of the most prominent representatives of this movement, that is, the Silesian physician Alfred Ploetz, and the Swiss psychiatrist and human geneticist Ernst Rüdin, expounded views that were altogether consonant with the philosophy inspiring the *Wandervogel* movement that exerted such a huge appeal on German speaking youth (Neuloh & Zilius 1982; Baacke et al. 1991). Although this movement was mainly pacifist and left-wing, it was soon taken over by a devious *völkisch* ideology stressing racial regeneration and militarism (Mosse 1982). Alas! a major attempt at fleeing the iron cages of hyper-rational modernity ended up nurturing a sick form of collective hedonism. Perceptively, Weber had foreshadowed this final outcome when, even though welcoming the exploration of inward and irrational eroticism and sexuality as an effective form of resistance against the disenchantment and alienation of a bureaucratised, routine-bound world, he warned that an exaggerated emphasis on its salvational as well as scientific function would be disappointing and self-deceptive and, finally, conducive to that self-serving nihilistic enjoyment of the *Genussmenschen ohne Herz*, i.e. sensualists without heart (Scaff 1987). Things got even worse than that. The eternal ambivalence of modernity, divided by the perennial quarrel between objectivists and subjectivists (Scaff 1987), saw the prevailing of the rationalisation and, allegedly, sublimation of both sensuality and sexuality propelled by a belief in humane and liberating scientific knowledge as well as by considerations of economic maximisation (Martin 1996):

That this was not a mere political strategy is evident in retrospect. An entire tradition revolving around reflection over the meaning of decadence, illness and death, namely German Romanticism (Hatfield 1952), was on the verge of extinction due to the bio-medical imperative to soothe and prevent pain. Hans Castorp, the protagonist of Thomas Mann’s “*Magic Mountain*”, flees the disease-ridden German flatland and takes up residence in a sanatorium where the illness is

¹⁰⁸ Most German racial hygienists were physicians with a strong training in genetics (Müller-Hill 1988; Weindling in Burley & Harris 2002).

¹⁰⁹ The German youth movement called *Wandervogel* (1896-1919) displayed many of the traits also characterizing Ploetz’s and Rüdin’s lifestyle and convictions (Neuloh & Zilius 1982; Weber in Mattioli 1995)

experienced in its full intensity. This option was not really absurd, given that "Der Zauberberg" is an epic of disease (Weingand 1971). After leaving the magic mountain to re-experience the urban malaise, Castorp is eventually drafted and sent to fight in the trenches of WWI where the idealization of death and pain would sound disgraceful.

Formerly, though, German Romantic poet Novalis had asked himself *könnte Krankheit nicht ein Mittel höherer Synthesis sein?*, that is to say, could sickness be a means of spiritual elevation (*Steigerung*) and purification (*Reinigung*)? (Weigand 1971). For Heine, Tyroleans were too stupid to be anything other than healthy, and submitted that *durch Leidenkämpfe könnten die Tiere zu Menschen werden* [through the struggle against suffering, animals could be turned into humans]. In keeping with these Romantic sentiments, Castorp believed in a sort of anti-*kalokagathia*, and argued that he felt baffled vis-à-vis a person who is at once dull and sick, because one would rather expect intelligent people to be sick. By contrast, to Settembrini, a most faithful heir of the Enlightenment, *disease is a humiliation, an insult to the human spirit, that must be resisted and overcome at all costs* (C.E. Williams in Bloom 1986: 40).

This latter perspective is by no means exempt from pitfalls. Countering the Christian doctrine that the sinners, i.e. those who cause suffering, will answer for their misdeeds in Hell, and therefore that there is no point in taking revenge in this life ("turn the other cheek"), the Enlightenment took a mundane attitude towards the problem of pain and encouraged men to seek after its roots and its possible cures. In so doing they did not realise that

...die größte Krankheit der Menschen ist aus der Bekämpfung ihrer Krankheiten entstanden, und die anscheinenden Heilmittel haben auf die Dauer Schlimmeres erzeugt, als das war, was mit ihnen beseitigt werden sollte

Nietzsche („Morgenröte“ quoted in Kowalik 1985: 32)

By this Nietzsche meant that the cure has relieved humans of their responsibility for their own suffering, and induced them to view themselves as victims of fate, and, ultimately, to neglect the values of self-determination, moral conduct, and self-growth; for the greatest health is that of the noble man who withstands pain and fights it. Those who choose the path of the externalisation of the causes and responsibilities for their suffering are instead prone to self-hatred, like Settembrini. Yet the same sense of intellectual pre-eminence permeates both discourses. Whether they inhabit the suburbia and contaminate the abodes of the intelligentsia, or dwell in the countryside and on the mountain slopes, perturbing with their "sturdy ignorance" the lofty speculations of the members of the upper classes, the masses embody a different species of humans whose utility has not yet been defined save the necessity to have at one's disposal a limitless source of cheap labour.

5.1 SCIENCE AND BARE LIFE

A new species would bless me as its creator and source; many happy and excellent natures would owe their being to me. No father could claim the gratitude of his child so completely as I should deserve theirs

Victor Frankenstein (Nora Crook 1996: 37)

Are we doing something terrible by ameliorating the illnesses that our compassionate policies of the present and past have helped create?

Daniel Koshland Jr. (in Stock & Campbell 2000: 26)

I believe it is a moral obligation of parents to act in their children's best interests, and by definition I think greater intelligence, health, and longevity is in their interest

James Hughes (in Stock & Campbell 2000: 132)

In 1912, North Carolina's superintendent to mental institutions was persuaded that *the ultimate aim of the school is the elimination of feeble-mindedness from the race by segregation* (Noll 1995: 26). Ironically, his equivalent in South Carolina only 4 years later submitted that *if our institution does nothing more than incarcerate, teach and train those admitted thereto, of course it will have failed in many of the high purposes for which it is intended* (Noll 1995: 26). Noll comments on this discrepancy of views by observing that historically the social control of deviance proved incompatible with a complementary and not necessarily antagonistic desire that the feeble-minded be trained and reintegrated into society as productive citizens. This very divergence was to be fatal in Germany, following the 1925 major economic crisis, when the sophisticated network of clinics and hospitals where genetic counselling services were provided¹¹⁰, and that had been instituted also thanks to the political lobbying of social-democrats and feminists, began to change its nature. Financial straits convinced many that more heedful reproductive behaviour was imperative (Usborne 1992). Some went to great pains to turn it into a compulsory service that, alongside a national data-bank for hereditary conditions, was meant to carry out a systematic, collective screening of the German population (Weindling in Lee 1990). All in all, this trend could be seen as acceptable in view of its pedagogical and preventive goals (Usborne 1992).

Now, the ghastly developments of such a system accrued from unbearable economic and social pressures that, in theory, could present themselves once again. The question then becomes: in such circumstances, could genetic screening and the termination of pregnancy in the collective interest be made compulsory (Baudoin 1994)? An indication is provided by an historical analysis of the societal perception and treatment of people with disabilities, which shows that there is no trace of a seamless historical transition from persecution or desertion to a sensible and caring attitude (O'Brien 1999). Instead, economic, social and political causes have severely affected their fate along an erratic course.

Guardedness is indispensable when it comes to exploring the meaning of personhood in relation to health, progress, and collective welfare. I agree with Ambroselli (1994) that the notion of personhood is so vague that the very pursuit of predictive medicine could devalue it. Instead the conclusions that Thomas (Thomas 1995) draws from the correct assumption that personhood cannot be defined by means of someone's genotype because this smacks of genetic determinism and the genotype cannot be held as sacred, are debatable. I object to his subsequent deduction that inasmuch as the only sacred values are freedom and equality, then genetic manipulation would not constitute a menace to a person's integrity. It is precisely because freedom and equality (justice) are not solidly rooted in the contemporary social fabric, due to the heterogeneity of ultimate values intrinsic to advanced democracies, that critics of the applications of the Human Genome Project are more or less grudgingly compelled to play the part of Cassandra (Missa & Susanne 1999). In our society there is no such a thing as a free and educated decision because not all members of our society have access to the indispensable information, because personal choices are constrained by social prejudices, because of want of adequate financial means, and because most people simply neglect the advances that have been made over the past decades as concerns the life-standards of disabled people (Kitcher 2003).

The most obvious and notorious example of the dangerous ambiguousness of bioethicists in this moral sphere is Peter Singer's claim that the sanctity of life is a futile principle that must be substituted by a notion of personhood resting on the ascertainment of consciousness. Hence the killing of a baby within the first 28 days from her conception would be permissible. As George Baroff (Baroff 2000) points out, this would presuppose a view of individual existence as worthwhile, not for who one is, but for what one can do. There are numerous pitfalls in a view that treats as morally indistinguishable some higher forms of animal life and less fortunate human beings; and I believe the parallelism is fairly obvious between specieism – as Singer termed this doctrine – and the most arbitrary interpretations of Darwinism that, by devaluing certain less fit human beings, shored up a biological notion of bourgeois aristocracy and in so doing condemned the former to discrimination and, eventually, mass-killing (Weikart 1993).

¹¹⁰ The term genetic counseling was coined in 1947 (Rapp 1988)

The frailty of Singer's philosophising has been wholly exposed by Jenny Teichman (1997) who has tellingly entitled one of her essays "the false philosophy of Peter Singer". In it she easily pulls apart Singer's theoretical and logical premises, concluding that Bradley's contention that *the man of mere theory is in the practical sphere an useless and dangerous pedant* fully suits him, and that bio-ethicists remain trendy by striving to be more and more controversial through the undercutting of the most deeply-ingrained and widely accepted moral standards. She questions Singer's right to call himself a humanist inasmuch as he refuses to grant human beings as such an intrinsic value, something which lies at the foundation of humanism. Rather, Singer is an utilitarian anti-humanist for whom only the attainment of pleasure and happiness count as cardinal values and criteria for the assessment of how far a conscious person's life is worth being preserved. The one argument that is normally adduced to appease the critics is that this brand of utilitarianism is not only harmless but serviceable, because it goes against State interference with private choices. So, whereas Haeckel would argue that *reason tells us that a perfect State must provide the greatest possible happiness for every individual that belongs to it* (Haeckel 1910: 132), Singer trusts individuals to be able to make informed decisions. It goes without saying that only those choices are "informed" which are in agreement with bio-utilitarian doctrine. Better still, they should harmonize with any suggestions bioethicists may come up with, given that *the duty of a thinker is to follow what his intellect tells him, no matter what the logical conclusions may be* (Singer as cited by Klieme in Bach & De Kleine 1999).

Alas! the substance of such an ideology is not dissimilar from former, harmful instances of utilitarianism. The principle of social utility, together with the notion of the social cost of disease (Hats 1998), are two of the fundamental bequests of the Enlightenment (Goldberg in Essed & Goldberg 2002). The other mainstay of the Enlightenment is egalitarianism, but this latter must be superseded by the former, for in Singer's view human lives are not equal. According to him (Singer 1994: 190), *hardly anyone really believes that all human life is of equal worth*. The life of more sophisticated nonhuman animals is worthier than that of severely retarded human beings, and human beings who are not aware of being persons (namely, subjects endowed with consciousness) are potentially disposable. The unpleasant aspect of such a doctrine is that its champions do not seem to be aware that it has led to the devaluation of humanness, however defined, both on a symbolical plane, and – ultimately – to denying thousands of human beings their right to exist. Pietro Colla, also drawing on one of the most insightful passages of Hannah Arendt's writings¹¹¹, observes that to be nothing else and nothing more than a human being has all too often been equated to being an *Untermensch* (Colla 2000: 20, footnote 25). By the same token (Simone Weil, cited by Ambroselli 1994: 113):

ce n'est pas seulement impossible à définir en paroles... Mais cette notion-là [respect for the human person] ne peut pas non plus être conçue; elle ne peut pas être définie, délimitée par une opération muette de la pensée. Prendre pour règle de la moral publique une notion impossible à définir et à concevoir, c'est donner passage à toute espèce de tyrannie.

We do not know whether Singer is acquainted with such cautionary reflections. He presents no compelling motive for holding his views, except some sort of gut-feeling and the utilitarian tradition that, however, and I believe much to his annoyance, has not yet acquired the status of universal worldview that he feels it deserves. Furthermore, Teichman remarks that Singer scarcely distinguishes between personhood and humanness, running up against both the ordinary and the legal use of both terms (including the UN Declaration of Human Rights) and "bioethically" manufactures ideas of surreal persons, "overhumans" that lack materiality. She finally dismisses his position by commenting that practical experience teaches us that to regard the value of human life as a convention is utterly silly, insofar as Singer would be unlikely to encounter human beings who are not persuaded that their lives have intrinsic importance:

Personism – this is what she calls Singer's and other like-minded bioethicists' thought¹¹² on the subject of the sacredness of life – and Nazism share one fundamental principle, the principle that (non-criminal) human beings are of two types, those whom it is

¹¹¹ *Il semble qu'un homme qui n'est rien d'autre qu'un homme a précisément perdu les qualités qui permettent aux autres de le traiter comme leur semblable*

¹¹² Jenny Teichman (2001) names among the „modernisers“ of Anglo-Saxon bioethics Peter Singer, Helga Kuhse, Ronald Dworkin, Margaret Pabst Battin, and Jonathan Glover.

wrong to kill, and those whom it is all right, or even good, to kill. [...]. "life not worthy of life" would be a reasonably apt sub-title for chapter 2 of Singer's book *Practical Ethics*."

Teichman (op. cit.: 98)

Along similar lines, in an article called "Planet of the Apes" (*History Today*, Oct. 1994: pp. 6-8), Michael Burleigh writes:

What Singer fails to engage with is the fact that the Nazis and their Weimar intellectual progenitors were equally aggressively bent upon a secular, post-Christian alternative to the doctrine of the sanctity of human life ... When he writes, 'A self-conscious being is aware of itself as a distinct entity, with a past and a future ... Killing a snail or a day-old infant does not thwart any desires of this kind, because snails and newborn infants are incapable of having such desires' ... Singer is, no doubt unwittingly, for history is not his strong suit, using arguments and analogies employed again and again by the Nazis.

Most interestingly, Peter Singer and his colleague Helga Kuhse have edited an anthology of bioethical essays (Singer & Kuhse 1999) among whose contributors are John Harris and Nicholas Agar, two fairly radical thinkers. Here follows the standard logical thread of their speculations (pp. 165-170):

1. the first premise: it is not morally wrong to hope for a healthy baby, it is instead particularly advisable.
2. the second premise: disability is undesirable.
3. the first inference: not taking steps to pursue the goal of a healthy baby is morally reprehensible.
4. the second inference: *everyone should be discouraged from reproducing children who will be significantly harmed by their genetic constitution.* Please note that such a stance invariably glosses over the problem of who shall determine what "significantly harmed" actually means. But that this is the gist of the question does not seem to bother either Harris or Walter Glannon (see Glannon 1998)
5. the third inference: no moral difference exists between genetic therapy and genetic enhancement when this *protects life and health.*

Nicholas Agar (*ibid.*, pp. 171-181) similarly considers a rational chooser's scenario only, and sees no problem in parents wishing that their children may some day realise their own unfulfilled desires. More audaciously he goes so far as to claim that, had a 6-year-old Mozart mixed with children of his own age rather than perform musical exhibitions throughout Europe, we would probably not have *The Marriage of Figaro* or *Don Giovanni*. The thought that such a child as Mozart may well see touring as not the most enjoyable option, and might prefer to be playing with his peers, does not really cross Agar's mind. In "Bioethics" (Agar 1995: 13), he endorses a form of "ecumenical enhancement" explaining that

We attempt to list the whole range of morally acceptable human goals and aim to provide capacities which better enable a person to pursue them in such a way that does not discriminate between them.

Another prominent bioethicist who displays a similarly conceited assurance with regard to the goals of human genetic engineering is H. Tristram Engelhardt (1986: 381) who, in referring to the alleged predisposition of human beings to belligerence (one that has never been proven, a detail that he simply chooses to ignore), claims that:

In the end, the continued survival of humans may require engineering around such inclinations and such particular expressions of competitiveness

Consistent with my views on the subject is my disagreement with the current use of Rawlsian theories of justice (Ledley 1994; Holtung 1999; Buchanan et al. 2000).

It is just unimaginable that we should exclusively focus on individual freedom and self-determination when these rights cannot be really exerted by such a great share of the world population due to discrimination and disparities. In this sense, theories of justice of a consequentialist brand are to me of no use whatsoever, because their proponents seldom consider that a solely just society may well be one wanting in compassion and caring (Childress & Casebeer in Sumner & Boyle 1996) that is to say, one in which a right is re-interpreted as an obligation (Tong in Humber & Almedes 2000). Contrary to their opinion, the State has a duty to intervene to see that parents be in a position to choose without being

subjected to excessive pressure and expectations, as decisions are not made in a "social vacuum" (Kitcher in Pence 1998). Kitcher (2003) argues that "utopian eugenics" would entail that:

- a. Everybody must be in a position to make free and informed decisions
- b. Social support must be guaranteed for those born with genetic conditions whose effects can be attenuated through that very social support

But of course such an intervention could only be possible and effective on condition that a concept of human dignity could be formulated, which is an intractable problem because it entails a definition of what is human and who is a person, that is, the legal and ethical status of the embryo. For Taguieff this renders virtually insurmountable the conflict between the unconditional respect for human dignity and psycho-somatic integrity, on the one hand, and the supreme ideal of human perfectibility, on the other hand (Bachelard-Jobard 2001). This is so because human dignity is indissolubly bound to the notion of quality of life, which is subjective and as such undermines the idea of equality between human lives and, finally, of the sacredness of life. Quality and equality are thus pitted against one another, in a fashion that is akin to and stands in continuity with the *menschen-ökonomische Ethik* of the Weimar period (Meyer 1991), revolving around the notion of social cost of disease (Hats 1998) and with the characterization of citizens as *Menschenmaterial* in Germany, or *människomaterial* in Sweden, where the term was widely employed in the reformist rhetoric (Colla 2000).

Nowadays, for example, problems could arise in the field of insurance policy when insurers, being forbidden to readjust premiums depending on genetic information, will most certainly raise all premiums so that everybody will be asked to cover the costs of diseases of a genetic nature that in fact are only more or less likely to occur in any particular case (Beck-Fenwick 1998, Keller 2003). Public health care is another agency that could find itself in a sad plight. For example, US Medicare allocates inadequate resources through a cost-utility analysis of health interventions based on the assignment of numerical scores on a scale from zero to one, depending on the severity of the disease, in order to maximize health gains. These scores – Quality Adjusted Life Years (QALYs), Disability Adjusted Life Years (DALYs), and health-adjusted Life Years (HeaLYs) – are presumed to measure one person's quality of life and, substantially, devalue and disparage the life of chronically ill and disabled people. In other words, the individualistic and exclusionary notion of a quantifiable quality of life (QL) that recoils from deviance, unpredictability, and imperfection has substituted the solidaristic and all-inclusive concept of the sanctity of human life (SL) (Koch 2000).

People affected by Down-syndrome would be likely not to get any transplant, despite the fact that half of them are highly susceptible to heart pathologies and malformations. This has much to do with the notion of social worth, that is to say, social utility. People deemed as less productive than others – no doubt on an insurance- and income- or perspective income-basis – are automatically not worthy of expensive treatments like dialysis or organ transplants. Pace the Kantian principle that people should never be considered as a means to an end (in this case, social good), maximization of resources is the guiding criterion, and human beings are put after profit, which does not augur well for the future of advanced democracies (Himmelfarb in Burleigh, 1997). After all, as has been stressed on several occasions – among others by G.K. Chesterton (1922), Klausen (1997) and Colla (2000) –, eugenics served the interests of advanced capitalism, in so far as the latter was perennially in search of valuable citizens, that is, of highly productive labourers.

5.2. BIO-UTILITARIANISM

The role played by the guardians of humanity, for Kant, is that they actively operate to prevent the formation of such a recognition [that each individual must assume responsibility for one's actions] through such diverse tactics as a stress on the frailty of the individual, the elevation of heteronomous interests into ends, and the dismissal of the moral law as impractical or incidental

Owen (1994: 12)

A powerful alliance between medicine and the biotechnology industry will shape the choices available to individuals and divert attention away from the social processes that shape inequalities, the experience of ill health, and the human condition

Cunningham-Burley & Boulton (in Albrecht et al. 2000: 181)

But the pharmaceutical world, once I entered it, got me by the throat and wouldn't let me go. It had everything: the hopes and dreams we have of it; its vast, partly realized potential for good, and its pitch-dark underside, sustained by corporate cant, hypocrisy, corruption and greed. And it is not only the obvious sins that the pharma giants have to answer for: the dumping of inappropriate or out-of-date medicines on people they reckon won't know the difference; the arbitrary overpricing of their products, underpinned by the draconian exercise of patent rights. It is not the deliberate widening of a drug's specifications at whatever cost to the patient in order to broaden its sales base - so that, for instance, a drug that in Britain or the U.S. would be prescribed only for extreme cancer pain is represented to Africans as a simple headache cure. It is not even the suppression of contra-indications and side-effects, and the repeated campaigns, supported by the U.S. government, to halt the manufacture of generic drugs by countries that can't afford inflated Western prices. When the Thais wanted to manufacture their own generic drugs, for instance, the U.S. state department threatened to impose sanctions on the import of Thai timber. No, it's bigger even than all that - and, in the long run, worse. The pharmas, whether they know it or not, are engaged in the systematic corruption of the medical profession, country by country.

John Le Carre, interview, The Vancouver Sun, December 16, 2000

I suspect bio-utilitarianism is not exceedingly popular in Italy. The impression that a professional genetic counsellor I interviewed (Italy 2003) has formed of bioethics and bioethicists is emblematic:

bioetica...ma che tipo di potere la società gli potrebbe dare? In fin dei conti anche loro sono UMANI...in fin dei conti. Quindi tireranno pure loro un po' di qua e un po' di là: insomma non se n'esce. Mi piace l'idea di ammonire e non vietare, basta che costoro non diventino come delle Cassandra. Personalmente...ma non è importante...sarei abbastanza favorevole alle biotecnologie e alla ricerca in campo biomedico ma lo sarei di più se gli scienziati non fossero umani, cioè corruttili e imperfetti, come me e tutti gli altri della compagnia.

[Bioethicists...but with what kind of power could they be entrusted by society? After all they are HUMAN like us...after all. Therefore they too will shilly-shally. There's no way around it. I like the idea of cautioning without prohibiting as long as they do not become Cassandras. Personally...but this is unimportant...I tend to favour biotechnologies and biomedical research. But I would do so even more if scientists were not human that is, corruptible and imperfect, like me and anybody else]

Unsurprisingly, this bioethical trend views intellectual disabilities as compromising the possibility for the affected persons to lead a full life, that is one typified by the utmost intellectual competence. But a course of political action exclusively concerned with social utility and man's worth within a frame of abstract empiricism conceals totalitarian potentialities (J.L. Talmon 1970; Taylor 1993). It follows that the understanding of bioethics or philosophy on the whole as the teaching of a rationally achieved moral expertise is simply nonsense:

Philosophy as such delivers no verdict upon moral issues; there is no unique set of moral principles which philosophy as such underwrites and no question, therefore, of using that set to uncover the answers which philosophy gives to moral questions. When bioethicists deliver a verdict upon the moral issues raised by medical practice, it is their own verdict they deliver and not the verdict of philosophy itself; it is their voice we hear and not the voice of reason and rationality

Anne Maclean (1993: 7)

For Maclean human reason is first and foremost human and must be integral, and not alien, to human nature and human life. In other words, it is vain to juxtapose feelings and reason claiming that moral appropriateness cannot follow our emotional inclinations but must comply with the imperative of reason intended as rationality, the guidance of a thoroughly rational conduct. Much more persuasive is a conduct that accepts that there is no such a thing as an absolute conception of the value of life and that our practices are informed by what goes without saying, what we do as a matter of course (Maclean, *ibid.*: 135). It is only sensible to conclude that it is futile to specify rationally grounded reasons to promote animals and demote humans, as speciesists urge us to do arguing that the claim that men are equal is not supported by factual evidence. This claim is prescriptive and stems from the daily observation that animals cannot do what human beings can,

that there is a basic human reality, and that these assumptions have worked nicely to the present day. Ultimately, human beings simply have solid reasons to believe them (Boudon 1986, 1999, 2000).

Another aspect of bio-utilitarianism is that it is coherent with the way bio-politics developed in Western countries (see chapter 2), and proves that Agamben's treatment of the notion of "bare life" and the rule of exception are wholly applicable to the contemporary debate on bio-engineering and genetic counselling. I have previously (chapter 2) outlined Agamben's theory of the logical synthesis of biology, politics, and economy that emerged in consequence of the age-old paradigm of the politicization of bare life. Whether biotechnology and bioengineering could become a new eugenic ideology and ritual is left to the mood of the intellectual elite and of the lay-public that establish what comes next in the zone of indistinction between bare, biological life (*to zen*) and the good life (*to eu zen*), in that, as stated by Aristotle in the first book of "Politics", *we may say that while [the polis] grows for the sake of mere life, it exists for the sake of good life* (Norris 2000: 39). There follow a number of consequences (Norris 2000):

- good life is at once different from bare life and bare life is in the process of becoming good life.
- bare life and good life cannot be reconciled, as *the really important thing is not to live but to live well* (Socrates in *Crito*)
- the principal function of the sovereign power becomes controlling the *tacit, but growing insertion of their life* [the citizens'] *into the state apparatus* (Agamben 1995)

The governance of bio-politics in turn has made possible the constitution of a unique legal status, that of *homo sacer*. According to the Latin grammarian Festus (2nd century A.D.), *homo sacer* is someone who has committed a crime and, found guilty, finds himself between and betwixt *ius humanum* and *ius divinum*. The *homo sacer* cannot be sacrificed but the person who kills him is not indictable and by virtue of this special status he, like a trickster, contravenes all consuetudinary norms. For Agamben, later instances of sacredness are those whose life is judged *lebensunwertes* and parasitic by the sovereign power, and therefore reduced to merely disposable bare life, i.e. disabled and mentally retarded, Jews, Gypsies, the *Versuchepersonen*, guinea pigs subjected to atrocious medical experiments in the extermination camps; and the *néomorts*, that force us to tackle the question of brain-death and the medical and scientific utilization of their body (bare life). By the same token, *homines sacres* would be all people aged over 80 or 85, according to the proposal of Nobel Laureate and co-discoverer of the double-helix, Sir Francis Crick, that such people should be defined legally dead and denied expensive medical treatment (Seidelman 1989). I wonder whether he has changed his mind now that he has reached that age. Lying on the same threshold are also all those who are so connoted through "medspeak":

Which includes such mnemonic expressions as "SHPOS" meaning "a Subhuman Piece of Shit" or "Gomer" which stands for "Get Out of My Emergency Room" or "a human being who has lost – often through age – what goes into being a human being"

Seidelman (1989: 444)

The ironic remarks of some genetic counsellors about the adversities faced by their patients encountered by both Bosk (1992) and myself could well fit this interpretive framework (see below). After all, in a eugenic regime disabled people would be probably treated as *homines sacres*, borderline figures embodying the twilight zone, *terra di nessuno* ["no man's land"] in Agamben's words, the zone of indistinction where zoe and bios at once constitute and exclude each other. There, customary morality loses its meaning and the rule of exception prevails. The relevance of this argument for a social and ethical study of reprogenetics is evidenced by Andrew Norris (2000) who explains that because of the forthcoming advances in the field of genomics the definition of humanness will soon become too fluid to serve any legal, scientific, ethical, and political purpose.

The chief predicament we will face is the value we want to attach to the life of disabled people. Genetic engineering brings us to a world where positive eugenics and cloning will be viable options for prospective parents. These are the questions that will accompany us throughout this journey (Weikle 2000; Danforth 2000):

1. If disability is not desirable then why not prevent it?

2. If some characteristics and capabilities are desirable then why not promote them?
3. What characteristics do we want to shape and which do we want to leave to choice?
4. Whose truth informs what kind of legislation?

One professional category that will have to confront this challenge are of course the genetic counsellors. Genetic counsellors were not originally meant to be included in the present research because I still believe that since their work criss-crosses a large variety of extremely topical issues it warrants a separate study. Nevertheless, I did resolve to interview three students enrolled in a genetic counselling Master programme in Canada and one professional genetic counsellor in Italy. Unsurprisingly, the literature on this subject is deficient, given the novelty of such a professional figure. The sociological inquiries on the self-perception of genetic counsellors have been few and far between and next to none those highlighting the training of the professional ideology of genetic counsellors. My sample is certainly too limited and does not enable me to draw meaningful generalisations but I did find out that the comparison between my data and the data collected by other social scientists is not insignificant.

Shortly after WWII, in 1947, Sheldon Reed coined the term "genetic counseling" which would designate the consulting provided to couples with an history of genetic diseases by professionals with a training in genetics. From the inception, those geneticists who took part in such a novel undertaking laid a strong emphasis on neutrality and non-directiveness. However, many among them did not dissimulate their advocacy of eugenics, as they were persuaded that what was wrong with eugenics was not the goal but the means (Resta 1997).

In the same year, 1952, Clarence Oliver declared that it was his duty to discourage couples likely to beget children with "undesirable traits"; Sheldon Reed, drawing on the rather arbitrary assumption that mentally normal people, as a rule, behave normally and therefore in a socially acceptable manner, concluded that such citizens will voluntarily choose eugenically sound procreation once genetic counseling is made available; and Lee Dice held that genetic counselors should not merely concern themselves with the well-being of a given family, but also with the undesirable propagation of disadvantageous traits amidst the population (Resta 1997). As to social interventionism, in 1973 James V. Neel, one of the first geneticists to serve as a non-directive genetic counsellor in the 1950s, submitted that as screening could not pinpoint all genetic predispositions, *perhaps we should encourage the total population to embark upon a regime which can only result in better health for the average person* (Hilton et al. 1973: 359). Twenty years later, on occasion of the 1993 centennial tribute to J. B. S. Haldane (Majumder 1993: 338), he reiterated this argument even more forcefully:

Look where practical leaders have taken us. Now should be a time of profound reassessment...humans will need to exhibit much more self-discipline than in the past. [...] Some will find that what I am espousing smacks of coercion, an affront to "free enterprise" and "human individuality". I remind them that in times of perceived crisis in the past...humans have accepted some mobilization and loss of individual freedoms [...]. There is no professional group better qualified, or more oriented, to be ombudsman for the future [than scientists], but yet we haven't been doing much of that recently

In the light of such statements, it is remarkable that such an absolute commitment to a value-free genetic counselling could persist for decades in North America, especially in consideration of the fact that in England and continental Europe directive counselling is not opposed (Cohen, Wertz, Nippert, Wolff 1997; Wertz 1998; Rapp 2000). However, this commitment has come increasingly under attack by genetic counsellors themselves (McConkie-Rosell & Sullivan 1999). Some (Harper & Clarke 1997) argue that the excesses of free market and social coercion cannot possibly be countered by specialists. Others (Benkendorf & Prince 2002; McCarthy Veach, Bartels, LeRoy 2002; Weil 2003; Bowles 2003) underscore that counselees are more resourceful and resilient than many professionals have come to believe and that genetic counselling should be viewed as an interactive process (shared decision making) involving a great deal of psycho-social consideration that clients may have not contemplated. Furthermore, *unacknowledged directiveness could be far more manipulative* (Williams, Alderson, Farsides 2002). These are my personal views on the subject.

The most complete and insightful work on genetic counsellors' self-perception is in my view Charles Bosk's "All God's mistakes" (1992). Having the opportunity to devote a great amount of time to the investigation of the practice of genetic counselling in the USA he came up with a remarkable number of keen observations that should call for a follow-up that, to my knowledge, has been conspicuous by its absence. By and large, Bosk remarks that this group of medical professionals has been humbled by the treadmill character of their duties that do not involve states of emergency, direct life-and-death decisions, and sometimes not even the gratitude of patients. In most cases pre- and post-clinical meetings centre on the discussion of scientific publications and the display of sometimes rather distressful pictures of severely abnormal children. Given their professional ethos, genetic counsellors are not permitted to make a decision for the prospective parents who have come to see them prompted by deep concerns about the health of the foetus. Although in most countries genetic counselling is directive because it is thought that one of the chief aims of such a profession is to decrease the frequency of harmful genes in the population (Wertz 1998), in North America they must be absolutely neutral and non-directive. In this way the pressure and the associated sense of empowerment that typifies their colleagues' practice is somewhat lessened. This impression is borne out by the experience of one the students of genetic counselling who, to my observation that they are compelled to cling to a non-human imperative of neutrality and non-directiveness, responded as follows:

You're right. Patients often get frustrated because they come to the appointment expecting to be told what to do. After all, that's what most people in the medical profession do. But what we can do is ask them questions to help bring out what would be best for them. And based on their answers we can say things like "Well, based on what you've told me it might be best for you to. . . ." Besides giving information, we help them come to a decision that's best for them.

The three students of genetic counselling I interviewed agreed on this point. The Italian professional provided a more nuanced reading of her profession and ethical duties that is extremely instructive about the cultural discrepancies separating Old Europe and the New World:

Io credo che per noi vecchi Europei (italiani vecchi in particolare), tutto quanto dici a proposito della non direttività quasi inumana ed alla deresponsabilizzazione ecc., sia più sulla carta che nella mente. Ed oserei dire: per fortuna (per lo meno da un certo punto di vista). Il nostro retroterra culturale viene sempre fuori, in qualche modo. Dico questo senza superiorità, veramente, anzi qualche volta tutto ciò può essere un ostacolo. E poi, dato che sono una donna, anche questo un po' mi aiuta. Ad ogni modo, sempre personalissimamente, più faccio questo lavoro, più ho tante domande e poche risposte. E questo non lo dico proprio solo "per dire", ma ne sono convinta nel profondo. Ed infine, e questo lo dico sottovoce, io aborro la bioetica. Spero che non suoni come una bestemmia. Quindi come vedi mi piacerebbe proprio parlare di bioetica.

[I think for us, old Europeans (old Italians in particular)¹¹³, what you say about the almost inhuman non-directiveness, the relief of responsibility, etc. is more appearance than reality. And I'd dare to say, luckily so (at least from a certain perspective). Our cultural background is somehow always there. I say that with no pretence of superiority, really. On the contrary this can be sometimes an obstacle. But then again, as a woman, that helps a little. Anyway, in my humble opinion still, the more I do this job, the more questions and the fewer answers I've got. And I am not saying this for the sake of the argument. I do believe that. At the end of the day, and I say this in a whisper, I detest bioethics. Hope it doesn't sound like a blasphemy. Therefore, as you can see, I'd really love to talk about bioethics].

Therefore Bosk is probably right when he states that genetic counsellors seem to display a more humble approach to health-care and that this is mainly due to the fact that their only function is that of decision-facilitators rather than decision-makers. One of the crucial issues arising from this state of affairs is whether this role could ever be perceived as dissatisfying and whether a change in the surrounding cultural and ideological climate could lead them to push for a change of attitude. This is not an implausible scenario given that, according to a recent survey, 20 percent of American fertility specialists declared that a woman should terminate the pregnancy if the screening shows that the embryo has a predisposition to obesity (Bach & De Kleine 1999). More generally, it is illusory to believe that there can be an alternative to

¹¹³ Please note that the adjective "old" acquires two different meanings in this sentence. "Old Europeans" stands for Europeans with a millenary history whereas old Italians means that what she is saying is especially true for people with a long professional experience under their belt, who happen to be Italian. The underlying assumption is that Europeans have much in common even when it comes to a moot point such as the best way to do genetic counselling.

the forthcoming eugenics revival (Kitcher 2003). The real problem is, once the genotype of future people will be identifiable, a world that still tolerates enormous social and economic inequities is unlikely to object to a liberal and voluntary form of eugenics (Caplan 1997).

One thing I feel positive about is that students of genetic counselling do envisage their future profession as a true vocation. The keen enthusiasm I encountered among those Canadian students I have interviewed¹¹⁴ has no parallel in any other category of biomedical professionals. I distinctly remember the moment one of them exclaimed: *We are pioneers, damn it!*

This is also most certainly due to the fact that many never found laboratory work a very gratifying activity – some felt they were clumsy, others thought they had no knack for experimentation – while they saw genetic counselling as an amazingly effective way to apply their expertise to real life predicaments. This sense of being substantially serviceable to human beings in their most difficult choices is definitely what set them apart from the other graduate students I interviewed who, if nothing else, at times revealed a certain tinge of frustration stemming from the secluded laboratory environment. Conversely, genetic counselling students could barely contain their contagious passion for what they were doing and wishing to accomplish in the years to come. Something has changed though in the interaction of genetic counsellors and surveyors since the time of Bosk's first inquiry in the late Seventies. Over the past two decades the discrepancy between my own experience in the field and his has grown obvious and acute. Thus he recounted his first encounter with genetic counselling (Bosk 1992: 5):

non negotiation with hospital administrators, no multiple clearances from multiple clinicians, no endless rounds of meetings to explain who I was and what I was about. I was never asked to make elaborate promises to safeguard the confidentiality and anonymity of the institutions or its physicians. Never was there any suggestion that my work be subject to any sort of prepublication review

Alas! in my case bureaucratic requirements and strong suspicions about my ulterior motives and personal agenda have certainly contributed to my final decision to discontinue my participant observation and confine my analysis to the tiny amount of data I had managed to collect. Because in Italy I did not encounter the slightest suspicion about my intentions I was taken aback by an atmosphere that was not really conducive to a smooth-running survey. Periodical confrontations between genetic counsellors and disability activists and a journalistic coverage that was judged to be unsatisfactory by the professional genetic counsellors got in the way of a fruitful exchange of views and information. This is all the more disappointing in view of the curiosity displayed by the Italian genetic counsellor as well as by her Canadian counterparts about how genetic counselling is conducted abroad. It is only fair to say, though, that I definitely lacked those diplomatic skills, ingenuity and adroitness that would enable a professional anthropologist to overcome those obstacles. I can only hope I have learnt the lesson.

In Italy, as I said, I was not requested to provide any form of validation of my research aims and proficiency. The genetic counsellor I contacted was quite surprised that I had to go to great pains to do my fieldwork interviewing, and her comment was rather instructive on the differences between the way genetic counselling is intended and practiced in Italy and Canada:

Le loro preoccupazioni mi sembrano così strane. Capisco se la cosa finisce su un giornale che ne fa uno scoop con titoli del tipo: eugenetica, pratica corrente dei nostri genetic counsellors¹¹⁵. Che poi questo termine: eugenetica, lo trovo orribile, da qualunque parte lo giro.

[‘their worries seem so weird to me. They would make sense if this thing wound up on a newspaper with headlines such as: eugenics, the current practice of our genetic counsellors. But then again this term – eugenics – I find it horrible, from whatever angle I look at it’]

¹¹⁴ Because there are very few Canadian universities running programmes of genetic counselling, I chose to omit where I did my fieldwork in order to protect the privacy of these students.

¹¹⁵ There is no such a thing as an official Italian denomination of this professional category

This reply surprised me because in an eminently Catholic country one would expect more mistrust and prejudices against someone inquiring about the opinions of practitioners of a discipline that, after all, questions the notion of "sanctity of life".

The one feature of genetic counselling that most conflicts with this concept is not so much the indirect support to pregnancy termination as the habit of making rather witty jokes about their clinical cases. Bosk observed that the sense of being unable to provide an adequate professional service to people who do not seem to listen to reason, accounts for this seemingly objectionable attitude. Drawing on my personal experience as a volunteer carer of terminal patients and non-autonomous elderly people I personally feel that the answer lies elsewhere. The experiencing of deeply unpleasant feelings vis-à-vis borderline situations (i.e. *homines sacres*) compel individuals to seek to metabolise the event by readjusting one's cognitive and psychological frames. In the genetic counsellors' case it is perfectly possible that a measure of defusing irony and exorcizing cynicism serves the all-important purpose of making individual and collective re-adjustments and negotiations possible. It is therefore unsurprising that the overwhelming sense of impotence felt by genetic counsellors expected to fix what cannot be fixed, and to confront the absolute randomness of life-events, must be somehow channelled away from anger and suffering, which would harm the individual's image and the hard-won equilibriums internal to a group of professional peers. However, I am sceptical about the assertion of one of Bosk's interviewees who explained that he frequently thought of himself as an astronaut boarding a spaceship heading for a different planet, a planet where terrible things happened, things that would not happen on his own planet. I wonder if that counsellor was being sincere or simply sought to please the interviewer by adapting to the ideal-type that he presumed Bosk was after. My participant observation revealed no such schizoid experiences. Genetic counsellors were neither light-hearted nor hardened by unpleasant experiences, neither heroic nor unusually wise. They were more or less regular human beings who positively believed that their work was not merely useful but determinant for the happiness of countless families. So, when I put forward my views on how the practice of genetic counselling might change over the next decades:

You might develop a sense of powerlessness as more and more information will be available and there will be a shortage of professionals like you (massive pressure), and there will also be confusion about the definition of what is normal and what is not, what is a disease and what is not, what is good and what is bad (massive ethical dilemmas)

one of the students replied:

Yes, there is a lot of controversy out there right now. For example, we had a group from the Disability Office come and talk to us who were against termination as they see their disability as a difference, not a disability. The deaf community is really big on this. But everyday there are couples terminating for the same disabilities these people have (who live full and happy lives).

I am not ruling out the possibility that dramatic circumstances could arise that would put a real strain on them, but I do feel that they believe the game is worth the candle; that is to say, for every unfortunate occurrence many more would be the successful accomplishments from both a human and a professional point of view. On this count the same student added:

I don't agree that we will become eugenicists. I believe we offer choices. It's been done where a baby has been selected to be deaf as the couple were deaf and lived in the Deaf community. We can help couples have children without debilitating disease - which isn't really eugenics but more about health care. There is the possibility of choosing children for certain traits in the far future but nuclear energy also brought the atomic bomb. It's about how we use the information.

At the same time counsellors must thus ignore the collective implications of their practice, neglect issues of justice and equality and look to their patients as clients, or else they risk undermining the theoretical and moral premises of their profession and accepting the labelling of eugenicists. Again, they are facilitators, not decision-makers, agents of freedom not of its curtailment (Kass 2002). On the other hand, how are they supposed to tackle such tremendously intricate questions as the meaning of health, happiness, normality, dignity, and collective solidarity? Some scholars have suggested that the technical and ethical training of genetic counsellors be supplemented with the teaching of the limits of any claims of neutrality, equitability, and non-directiveness (Bosk 1992; Bartels et al. 1993). The viability of this option ought to be

carefully considered once we accept the fact that genetic counselling is on the road to becoming a need as well as a lifestyle (Conrad & Gabe 1999) and a differential access to modern techniques has already been detected with respect to IVF treatment (Lynn-Steinberg 1997). Where would totally neutral social actors draw the line in a free market where the individual is entitled to buy whatever genetic service? And how could they operate morally in a coercive and iniquitous social context if they are bound to maintain a non-directive stance (Harper & Clarke 1997)?

On the other hand, that of non-directiveness is a convention that has no parallels or precedents in the medical profession. Medical practitioners have normally been taught that making decisions for someone else was part and parcel of their duties and their training was specifically designed to prepare them for such a great responsibility. This may perhaps account for the sizable number of British medical professionals who admit that in the field of genetic counselling, regardless of its non-directive nature, it is not uncommon that clients' decisions are shaped by their advice (Kerr et al. 1998). But is this really a problem?

Let us remember the aims of eugenics:

- The manipulation of human genetic pool as the most efficient instrument of social amelioration.
- The prevention of disease as opposed to expensive medical therapy.
- The attainment of happiness by granting people the possibility of feeling healthier, prettier, brighter, etc.

We also know its historical consequences:

- No substantial alteration of the genetic pool.
- Enforced sterilisation and "euthanasia" of people deemed unfit.
- Social and political measures aimed at the betterment of the lifestyle of the upper classes to the detriment of the underrepresented and/or disenfranchised minorities.

A new brand of eugenics lies ahead. There are four possible types of interventions on a person's genetic patrimony (Gavroglu et al., 1995; Vollrath 1990), and all of them presuppose that human procreation will be brought into the laboratory, with familial and societal relationships bearing the brunt of this transition:

- somatic cell gene therapy eliminates the clinical manifestation of genetically-caused disease on an individual without affecting the individual's progeny.
- germline gene therapy is the insertion of a healthy gene into a human egg.
- enhancement genetic engineering refers to the modification of single traits in an individual such as the height of a child.
- eugenic genetic engineering applies to the alteration of complex traits involving multiple genes, such as intelligence and personality.

The problem is not whether these interventions will take place, because they will, but only when and what the effects will amount to. Most of all, will they grant us the happiness we are desperately looking for? Leon Kass (2002) is extremely sceptical on this count and his viewpoint warrants a thorough analysis. In tune with the thrust of my dissertation, he argues that the major threat to liberal democracies is represented by those principles that we most cherish, that is (Kass 2002):

- devotion to life and its preservation;
- freedom to inquire, invent or invest in whatever we want, regardless of the morality of the enterprise;
- a commitment to compassionate humanitarianism, whose upholders are willing to pay the highest of prices in the name of freedom from want, suffering, and aging;
- the confident pursuit of progress through the mastery of nature, fuelled by unbridled technological advance, oblivious to the fact that mastery of nature is tantamount to mastery over other human beings and that modern techno-science is by its very nature bound up with the idea of manipulability;

- the right to the pursuit of happiness, even when this is confused with self-indulgence and escapism;
- the separation of body and personhood, a dualism that obscures the anthropological evidence that ours are embodied lives and that our cultural and spiritual dimensions are experienced through our bodies. Hence the central importance of anthropology to the understanding of the social effects of genetic engineering;
- the exclusion of chance from our life, because what is accidental may hamper our search of happiness.

Kass, like me, is particularly concerned with two fundamental modern misapprehensions. First, an understanding of happiness as freedom from chance, lack, toil, illness and the risk of death, obtained through the replacement of nature by human will, that is, the utopian vision of human perfection by scientific means. Secondly, equally disputable is the inclination to subject the principles of justice, virtue, happiness, and dignity to rational, scientific inquiry, as though their validity could be grounded in non-subjective, natural, deterministic, a-historical standards. Paradoxically, and this is my opinion, the scientific worldview has yielded immense power to humankind but, backed up by anthropological relativism, has partially undermined those moral premises that were wisely intended to harness the effects of that worldview. As a consequence, those whose ethical standpoint is most affected by this cultural shift, namely biomedical scientists, tend to exhibit a worrisome conceit, considering all restraints to scientific research as the result of habit and ignorance, rather than to any serious concern about the undesired consequences of scientific progress. Among these consequences may be counted (PCBE 2002):

- The loss of awe and humility vis-à-vis life with its concomitant devaluation exemplified by the view of the embryo as just a "clump of cells" or a "pile of raw material", i.e. as a means, not an end, instead of a potential human being ("being-in-the-way").
- The potential for an alteration of our conception of parental and filial relationships, following a shift from child as a gift to child as a valuable property, a self-designed product, a long-term project; and a shift from the child's right to freedom and independence to the parents' right to determine their child's development from the womb as a means of self-fulfilment.
- The prospect of manufacturing humans for hedonistic ends, one that is candidly justified by the leading bioethicist H. Tristram Engelhardt in a rather "Karamazovian fashion": *if there is nothing sacred about human nature (and no secular argument could show it to be sacred), there is no reason why, with proper reasons and with proper caution, it should not be radically changed* (Engelhardt 1986: 377).

Another summary of the problematic issues related to the application of genetic information to society has been compiled by Sally MacIntyre (Macintyre 1997):

1. geneticisation of society and genetic reductionism: behavioural and physiological variations determined by genetic variations (Lippman 1991). The prism of heritability distorts our views of social and personal issues (Duster 1990)
2. underestimation of the role of environmental factors in disease: commercial pressures for susceptibility testing for common disorders *will promote the notion that genetic endowment and chosen lifestyle together determine future health, while the importance of material circumstances (especially poverty) in creating ill health will be glossed over* (A. Clarke 1996: 35)
3. discrimination in insurance, employment, healthcare provision, and so forth. The double-bind everybody will confront goes like this: you may become an object of discrimination either because you refuse to test your DNA or that of your children, or because you actually opt for it and you or your children test positive (Billings et al. 1992)
4. changed attitudes to parenthood, and commodification of babies;
5. diversion of care, treatment and resources taken away from people with genetic abnormalities;
6. screening for conditions for which no effective treatment has been found;
7. Following a screening, what changes in one's lifestyle might occur, and how effective they would be.

Ultimately, a legitimate fear of irrational abysses must not obscure concern for the excesses to which a blind faith in rationality leads many idealists in politics and science. An instance of that is the thought of American philosopher Daniel Dennett who on several occasions exhibited a fierce resolution to demolish the upshot of centuries of human thought. In his "the Elbow Room" (1984: 156) he clarifies his view as follows:

It could be, for instance, that the concept of personal responsibility enshrined in traditional (western) morality is subtly incoherent, and that we ought to revise or even jettison that concept and family of ideas surrounding it: guilt, desert, moral praise, and punishment, to mention the most important. We might, for instance, have to demote ourselves somewhat from our traditionally elevated status as moral agents in order to secure a defensible morality.

What goes unrecognised among several bio-ethicists is that an exclusively philosophical rationale does not do justice to the complexity of issues that are, first and foremost, of a social nature. In concordance with this position, Tom Shakespeare contends that it is political philosophy rather than moral philosophy that must provide the ground for a global debate on biotechnologies¹¹⁶.

Incidentally, what is most conspicuously absent in the bio-utilitarian perspective is social analysis, and it is astonishing that so many philosophers are loath to admit that analytical philosophy alone is useless when it comes to assessing the impact of biotechnologies. I find it hard to believe that, with decades of sociological and anthropological research under our belts, we should still take seriously the naïve view of society as a sum of needs and desires, and of life as the maximization of happiness, with no mention of the unintended consequences of individual action and of the sheer unfeasibility of regarding happiness as a calculable end¹¹⁷.

Correspondingly, drawing on disability studies that have directed attention to the external constraints that cause people with genetic impairment to feel seriously disadvantaged (Shakespeare in Conrad & Gabe 1999), Shakespeare has objected to treating disability as a kind of harm that is qualitatively different from other socially constructed "harms", such as poverty and race. Indeed the rhetorical exploitation of disability made by some champions of human genetic engineering seems to be aimed to produce a sympathetic reaction among a readership driven invariably to regard all disabilities as "random tragedies" and "horrors" (James Watson 2000). A factual assessment of human existence for Shakespeare would instead comprise the notion that the unlimited malleability of human potentiality is a myth that must be exploded, for lives are restrained by tastes, inclinations and historical and social circumstances.

The truth then seems to lie halfway between the two antagonistic positions of disability activists and human germline advocates: disparities exist, their origin is both biological and social, and nobody is exempt from abnormal characterizations, that is to say, there is no such thing as a norm.

However the systematic screening of foetuses will not prevent all "defective children" from being born and therefore the few who manage to slip through the net will probably be subjected to discriminatory practices, no matter how illicit these may be (Childress & Casebeer in Sumner & Boyle 1996). This is best expressed by Ernst Klee's cynical formula that *der Traum des Genetikers, Behinderte zu verbinden, ist der Alptraum des Behinderten* [the geneticists' dream is the disabled people's nightmare] (Klee 2001: 274). Some of the more troubling ethical implications of genomics stem precisely from the fact that a diagnosis can be made without any prospects of therapy. Consequently, to be sick in modern societies has become less a biological event than a cultural identity that doctors and bio-medical scientists authorise. The fact is, that the Enlightenment principle of equality, once it becomes absolute, moves society to devolve to specialists its normative function by endowing them with the right to determine autonomously their professional charter (Hassenteufel 1997). This is the consequence of an arbitrary re-interpretation of the goal of the universal emancipation of human beings involving technical rather than political means.

¹¹⁶ personal communication

¹¹⁷ Ironically, this doctrine as it were resembles Russian rational egoism (Pisarev, Chernyshevsky), which was mauled by Dostoevskij with his *Notes from the Underground*

The irony of all this is that, as we increase our mastery over nature and ourselves, we lose our command of the basics of morality and of what it means to be normal, to be healthy and to be fit. It is not that, as Nietzsche would have it, science is a source of nihilism. Science simply uproots traditional theological and philosophical signposts, and gradually substitutes them with other signposts of a medical and scientific nature (Kass 1985). But there is the rub. The diffused impression among experts (Tudge 2002; Lewontin 2002; Timothy F. Murphy in Singer-Kuhse 1998) is that the fact that the boundary between "normal variation" and "genetic disease" is in part a social construction¹¹⁸, which entails that "normality" and "abnormality" are historically and culturally relative, is not easy to convey. Simpler explanations – that is more deterministic, essentialist, and reductionist – are more liable to sound persuasive. The worst case scenario has been outlined by André Pichot (1995), and it is one in which our society winds up ruled by the *volonté technicienne de domination du monde*, together with repugnance to deviance and a desire for biological order, crass materialism, fanatical hygienism, and an ascetic cult of the perfect body. Scientists should always bear in mind what one of their most lucid colleagues once said (Primo Levi 1975: 35)

perché la ruota giri, perché la vita viva, ci vogliono impurezze, e le impurezze delle impurezze...ci vuole dissenso, il diverso...il fascismo non li vuole, li vieta...vuole tutti uguali. Ma neppure la virtù immacolata esiste, o se esiste è detestabile.

[For the wheel to spin, for life to live, it takes impurities, and impurities of impurities...it takes dissent, diversity...fascism does not want them, it forbids them...it wants everyone identical. But immaculate virtue does not exist, and even if it does, it is detestable]

Past events should warn us not to understate the risks of too sharp an emphasis on the difference between what we judge normal and what we judge non-normal. For centuries the Church has separated the poor in spirit from the "normal", and on March 8 1937 the SS periodical *Der Schwarze Korps* explained that when the Gospel of Matthew (5: 3) recited *Blessed are the poor in spirit, for theirs is the kingdom of heaven*, that meant that every sensible person ought to admit that the feeble-minded has no mundane rights, whereas nobody would dispute their right to own the kingdom of heaven (Roger in Benichou 1987). Having said that, it seems to me that the misanthropic strand of bio-utilitarianism could turn out to be the thin end of the wedge and ultimately lead to the revival of the eugenic premise *ungleicher Wert, ungleiche Rechte* (Nitschke 1999).

In view of the unintended consequences of modernity and of the disposition of sovereignty to regulate bare life, Leon R. Kass's preoccupation with the results of an unrestrained development of bio-engineering (Kass 1985: 97) sounds all the more congruous:

It is this natural standard that most threatens the notion of human equality. For it leads most directly to the idea that there are second class human beings and subhuman human beings, not equally entitled to the rights of life or the pursuit of their own happiness. [...]. The fetus is only potential; it has no rights, according to this view. But all kinds of people also fall short of the norm: children, idiots, "defective" adults. It is this understanding of nature that has been used to justify not only abortion and infanticide, but also slavery.

As a result, disability activists are increasingly worried about the outcome of genomics. In their opinion, the notion of disability will be more and more regarded as a remediable distortion of the normal course of nature and, as such, most likely to be stigmatized and considered unworthy of social intervention. Furthermore, Dorothy Nelkin¹¹⁹ and Timothy F. Murphy (Singer – Kuhse, 1998) argue that the notion of disability will extend to more individuals than it does now. Among others, they cite alcoholism, obesity, susceptibility to serious diseases and pathologies. On top of that, social discrimination will gather volume owing to the extension of the range of states perceived as "defective" (phenomenon commonly labelled "genetic essentialism") and the high costs involved in targeted therapies. This, according to Günther Altner (in Barta & Grabner-Niel 1996) will reflect on the decision-making process in several fields such as healthcare, employment, insurance,

¹¹⁸ "The new genetics will cease to be a biological metaphor for modern society and will become instead a circulation network of identity terms and restriction loci, around which and through which a truly new type of autoproduction will emerge, which I call "biosociality". [...] Were such a project to be brought to fruition, it would stand as the basis for overcoming the nature / culture split" (Paul Rabinow, *Essays on the Anthropology of Reason*, Princeton University Press, Princeton, 1996: p. 99).

¹¹⁹ Galston – Shurr 2001; Kevles - Leroy 1992

education, adoption, privacy, indigenous rights, ecology and biosphere. It may also lead to the restoration of the traditional Calvinist belief in predestination, this time on a scientific or pseudo-scientific basis (Shipman 1994). As a consequence social inequalities could be accounted for by referring to innate genetic dissimilarities, therefore shifting the blame from society to genes, that is to say, fate (Dorothy Nelkin in Galston 2001; Nelkin-Linde, 1995; Murphy in Singer-Kuhse, 1998). It is safe to say that a modification in public policies would ensue, addressing biological factors and neglecting the many flaws of the capitalistic system, which is precisely what the higher echelons of society are arguably hoping for and what actually took place in Weimar Germany and elsewhere. Thus, for example, the rehabilitation of criminals would seem a task to be assigned to doctors and not social workers; pre-employment medical exams would comprise genetic tests; insurance and transplant policies would be established on such parameters (Nelkin in Kevles, 1992; Nelkin-Linde, 1995; Murphy in Singer-Kuhse, 1998). Accordingly, illness could be increasingly seen as an employee's own business, the consequence of a failure in addressing those problems caused by reckless dietary and hygienic conduct (Bryan S. Turner 1987).

Insofar as the way we manage our bodies reflects the kind of society we want to live in, the process of internalisation of societal prescriptions – something is good for you to the extent that it is good for your society – will operate through interventions on the DNA. The same formerly occurred in Germany when the social body was ridden of all those traits that “did not fit” and were “out of place” from the perspective of the Aryan mystique. The “healing mission” of Nazism with its accompaniment of atrocities and mass-murders was, after all, made possible by a rationale that had made those practices sound respectable (Wickler and Barondess in Teays & Purdy 2001). The prospect of a neo-liberal, possibly frivolous, eugenics is therefore no less threatening to democracy than an overtly centralised brand, insofar as it corresponds to the demands of a democratic state. This state, while allowing for greater latitude, must find ways of enforcing its laws and controlling the national budget, and it has successfully managed to do this by identifying medical and scientific techniques (knowledge-production), together with statistical methods and the bureaucracy (knowledge processing and policy-implementation), as effective means of population management and social control. The question I pose is this: do we really believe that a couple making a decision against the possibility of having their baby genetically engineered could neglect to consider how their children will be judged by their peers, and especially how other parents and relatives will judge them for not having resorted to the available techniques? But what comes next? Where and according to what parameters do we draw the line in a post-industrial, post-Christian world where traditional values are weak and we must redefine our conception of humanity? How do we cope with the moral issues arising from the alteration of our bodies, personalities, and social structure? How can scientists engage the ethical questions posed by bio-technology? Shouldn't anthropologists seek to foresee what is at stake here? Or do we only analyse the consequences once they have occurred?

It seems to me that a bio-utilitarian outlook is structurally blind to the fact that decision-making does not take place in a vacuum. At the end of the day, it makes little difference whether it is the State or public opinion that exerts pressure in favour of positive and negative eugenics, as it is public opinion that ultimately determines who is going to govern the country and what to expect from them. Thomas Osborne's treatment of the relationship between health and statecraft in Germany and France casts light on this matter (in Peresen & Bunton, 1997: 178):

The German idea of medical police and the French ideal of a right to health for all have a certain amount in common in that they both assume a one-way, determinate relationship between statecraft and the production of health. [...] In the one, the pursuit of health is an aspect of statecraft. In the other, statecraft is an aspect of the pursuit of health. In each the relation can be described as being determinate in that the augmentation of one value (health or statecraft) will result in the augmentation of the other.

This means that a democratic and progressively-oriented socio-political environment does not necessarily lead to a democratic model of enforcement of the right to health. When health, from being a right, turns into a citizen's duty, the whole idea of democracy is in peril, especially because this is a transformation that mainly occurs unconsciously but whose upshots are quite tangible (Vigarello 1993). A duty to health may bring with it a conceptual shift as concerns the aptness of genetic screening for reproductive choice. Sally Macintyre (1997) fears that some day we may start to think that, once it

becomes possible to prevent the birth of a foetus with a genetic condition, then parents may feel morally obliged to do that. Similarly, the right of parents to provide their children with the best opportunities may well become a social duty. Forms of legally sanctioned coercive policies that might ensue would be premised on (Childress & Casebeer in Sumner & Boyle 1996):

- A paternalistic legislative regulation (e.g. wearing helmets): assuming that genetic counsellors know better than the counselees the nature of a genetic disorder, then they should take the necessary steps to prevent any wrongful life;
- cost-benefit considerations of the financial burden on the individuals, their families, and society constituted by disabled people (which is actually the substance of the American National Genetic Disease Act)

That these measures may find wide acceptance among the population is not unlikely. This is true regardless of how agreeable the idea may sound that the State places our health and fitness high on its list of priorities. Witness the approving words of Franz Orsós, president of the Hungarian National Association of Physicians during his visit to Germany in 1937 (quoted by Proctor 1988: 284):

Never before has a nation so thoroughly protected its people from disease; never before has a nation concerned itself to such a degree with the health of "normal people" – the people who will be useful in the future.

Besides, the whole question would amount to a realistic appraisal of the competence of public opinion to discern whether the claim of scientific rigor does not really cover a simplistic view of social institutions, one according to which, as the trouble with human beings lies in deeply-rooted natural characteristics, then it makes no sense to seek to better the social environment (Kingsland 1988). However, this whole point is rather unrealistic:

Si les normes sociales pouvaient être aperçues aussi clairement que des normes organiques, les hommes seraient fous de ne pas s'y conformer. Comme les hommes ne sont fous, et comme il n'existe pas de Sages, c'est que les normes sociales sont à inventer et non pas à observer

George Canguilhem (1972: 194)

We shall allow or forbid them to live with their wives and mistresses, to have or not to have children according to whether they have been obedient or disobedient- and they will submit to us gladly and cheerfully.

The Grand Inquisitor¹²¹

Alors, c'est que tout, autour de moi, est mensonge, et moi, je veux qu'on vive dans la vérité. Car je sais ce qui leur manque, Hélicon. Ils sont privés de la connaissance et il leur manque un professeur qui sache ce dont il parle

Albert Camus' Caligula

We can talk principles forever, but what the public actually wants is not to be sick, and if we help them not to be sick, they'll be on our side

James D. Watson¹²²

People are on my side!

Severino Antinori, planning to launch a campaign in favour of cloning (Keller 2003: 85)

Genetic essentialism is not uncommon among physicians and health scientists (Fox Keller in Kevles & Hood, 1992). Although in fact selves are historically and culturally situated, in course of time – should this paradigm prevail – the essence of a person – that is, their identity – might simply be equated with their genome. The end-result could be a society where cultural diversity is overridden by genetic diversity – universal human nature, selfish genes, and defective alleles, etc..

Some lament that *the modern sciences are constructive, but they are no longer edifying* (Gyorgy Markus in Gavroglu et al., 1995: 141). Heaven help us if they were, and they try hard enough to be ... Among all the flaws and quandaries afflicting science, this is far from being the most alarming. On the contrary, it is imperative that scientists steer clear of enlightening intents, for the most important lesson we should learn from history is that scientists have no final answers and that theirs is an ongoing pursuit, a work in progress. Yet, the trouble with science, and with scientists in particular, is that they need *their own, very forceful, imaginative vision* (Midgley 1996: 139) of their rôle in society.

Now, following my understanding of David Stove's nosology of human thought (Stove 1991), I have drawn a comparison between certain public statements made by the founders of eugenics and some of the wildest and most disturbing speculations made by bio-scientists since the early 20th century and, later, the discovery of the DNA structure in 1953. The purpose of such juxtaposition is to expose those illiberal and discriminatory undercurrents that appear to cross historical and ideological boundaries without undergoing any significant changes.

Eugenics became fashionable only from 1910 onwards (David Barker in Gabbay, Webster et al. 1983). It is thus quite remarkable that already in 1911 eugenicist James A. Field voiced his dissent about some of the most obnoxious contributions to the eugenics debate, and observed that racism and revulsion against paupers might alienate a good few supporters and ultimately endanger the attainment of the eugenicists' chief goal, a far-reaching social reform on eugenic bases (Field 1910). His complaint followed certain problematic assertions made by Francis Galton and Karl Pearson, the former explaining that if he had omitted to refer to the repression of the inferior stock that was simply because it was

¹²⁰ F. M. Dostoevskij, letter to N.A. Liubimov (1879) in Kroeker & Ward 2001

¹²¹ excerpt from the Brothers Karamazov (1912) by Fëdor Michajlovič Dostoevskij

¹²² in Stock & Campbell (2002: 84)

implicit in the eugenic programme (1883), and urging around the turn of the century the cultivation of caste sentiments among those who are naturally gifted (Field 1910); the latter (1909; in Childs 2001: 2) bluntly commenting that

It would be possible to paint a lurid picture – and label it Race Suicide. That is feasible to any who has seen, even from afar, the nine circles of that dread region which stretches from the slum to reformatory, from . . . hospital and sanatorium to asylum and special school; that infernal lake which sends its unregarded rivulets to befoul more fertile social tracts.

Field's preoccupations were particularly well founded in the light of the scathing attack on eugenics that Benjamin Kidd launched on occasion of a speech delivered by Francis Galton before an audience of sociologists (Galton 1904: 13):

I have a distinct recollection of my own sense of relief that my birth had occurred in the earlier ages of comparative barbarism. For Mr. Pearson, I think, proposed to give the kind of people who now scribble on our railway carriages no more than a short shrift and the nearest lamp-post. I hope we shall not seriously carry this spirit into eugenics. It might renew, in the name of science, tyrannies that it took long ages of social evolution to emerge from. Judging from what one sometimes reads, many of our ardent reformers would often be willing to put us into lethal chambers, if our minds and bodies did not conform to certain standards.

Nevertheless these warnings did not have the desired effect. In the United States, Madison Grant brought in his final verdict. Social and biological misfits were a burden that modern societies could no longer afford. Only by filtering out “unsuitable candidates” and sterilizing them could the forthcoming degeneration of the human race be forestalled:

A rigid system of selection through the elimination of those who are weak or unfit – in other words, social failures – would solve the whole question in one hundred years, as well as enabling us to get rid of the undesirables who crowd our jails, hospitals, and insane asylums. The individual himself can be nourished, educated, and protected by the community during his lifetime, but the state through sterilization must see to it that his line stops with him, or else future generations will be cursed with an ever increasing load of misguided sentimentalism. This is a practical, merciful, and inevitable solution of the whole problem, and can be applied to an ever widening circle of social discards, beginning always with the criminal, the diseased, and the insane, and extending gradually to types which may be called weaklings rather than defectives, and perhaps ultimately to worthless race types.

Madison Grant (1916 [1926])¹²³

Finally, Leonard Darwin, one of Charles Darwin's sons, published in the same year a paper entitled “On the Statistical Enquiries needed after the war in connection with eugenics” in which, with the characteristic indifference of eugenicists to the feelings of those people who had their loved ones right in the middle of that carnage that was continental Europe, he maintained that the best men do not come back from war, that the unfit for the fight remain in Britain and reproduce, and that

It is true that wars in the past have at times raised the whole civil death-rate by imposing hardships on the population generally, and where this has been the case the total result may have been eugenic in consequence of the general weeding out of the unfit. Though no one can tell what lies before us, yet there is now so little signs of widespread and severe suffering at home that there is, at present, no reason to suppose that the foregoing conclusions as to the dysgenic effects of war will thus be falsified.

After WWII eugenicists simply went underground and let the dust settle, lurking for the time when scientific research would make viable and advisable within a liberal framework those interventions on the human DNA that had been advocated for decades, not least by the Nazis (Soloway 1990; Paul 1998; Paul in Maasen & Winterhagen 2001). But when leading researchers in human inheritability and scientists in general chose to speak out, they did not give the impression that the tenor of their arguments had changed appreciably. Below is a selection of their most questionable contentions.

Julian Huxley (Huxley 1947) did not object to Nazi eugenic measures on the ground of morality, humanity, decency, etc., but, though acknowledging that they were crude and unscientific, he dismissed them because they would turn out to be dysgenic in the long run and *in matters of evolution we must, I think, take the long view* (ibid. 47). He also added that the lowest strata, that he believed were genetically less well-endowed, reproduced relatively too fast. Therefore they had to be taught birth-control methods, not be granted too easy access to hospital treatment *lest the removal of the last check on natural selection should make it too easy for children to be produced or to survive* (ibid. 42), and long unemployment should be a ground for sterilization (Cawte 1986). Finally, he subscribed to the worn-out cliché that cultural evolution proceeds at a faster pace than

¹²³ Note that this book was favourably reviewed by a MIT geneticist, Frederick Adams Woods.

biological evolution and therefore exceptionally gifted individuals are indispensable to sort things out. That reform eugenics (Kevles 1985; Ludmerer 1972)¹²⁴ was merely a politically expedient façade is attested by what Frederick Osborn – one of the so-called reform eugenicists – declared in 1951 (Osborn 1951: 61), when one would presume that the interference of the State in the sphere of procreation had once and for all fallen into disrepute:

the state which fails to use sterilisation is guilty of a grave disservice to future generations, while at the same time it is squandering the taxpayers' money.

A.V. Hill, British Nobel Prize laureate for physiology, offers an emblematic rendering of the lingering apocalyptic scenario envisioned by certain scientists in the post-war period:

Some might [take] the purely biological view that if men will breed like rabbits they must be allowed to die like rabbits...Most people would still say no. But suppose it were certain now that the pressure of increasing population, uncontrolled by disease, would lead not only to widespread exhaustion of the soil and of other capital resources but also to continuing and increasing international tension and disorder, making it hard for civilization itself to survive. Would the majority of humane and reasonable people then change their minds?

A comparison between this assertion and the one¹²⁵ that the same scientist made one year earlier, in 1951, creates an unpleasant feeling, as though the credibility of scientists' public statements depended entirely on the circumstances, and logical consistency were altogether discretionary:

They [the scientists] have developed the habit of critical examination, but this does not save them from wishful thinking in ordinary affairs, or sometimes from misrepresentation (even occasionally from treachery and falsehood) when their emotions or political prepossessions are strongly enough involved...I would urge that scientific people do not get an exaggerated idea of their importance or of their moral superiority, but regard themselves as citizens who have the same moral obligations of honesty, kindness, courage, and tolerance as others. [...]. And scientists should be implored to remember that, however accurate their scientific facts, their moral judgments may conceivably be wrong.

It would be hard to encounter a more transparent contradiction. In 1956 Jean Rostand (Rostand 1956) contended that under a system of artificial selection individuals could be born whose intellectual skills would far exceed those of any human beings that had ever lived in the past. In fact, he feels confident that, until such a system has been tested, it would be unsound to set an arbitrary limit to what humankind might achieve. In 1963 Francis Crick, Nobel laureate for the discovery of the DNA structure, submitted that, as people should not have the right to have children unless proven genetically fit, they should be administered a chemical substance that would render them sterile, and the antidote provided only to suitable mating candidates (Wolstenholme 1963). Nazis also played with the idea of using a chemical additive to flour to the same end (Sax 2000). A few years later Crick submitted that a newborn child should not be regarded as a human being before passing several tests screening her genetic endowment that would establish her right to live (Weintraub 1984). Pichot (2000) notices that such a statement had already been made by Alfred Ploetz. But then again Crick had the following slogan written on a wall behind his desk: *reading rots the mind* (Perutz 1989: 194). Linus Pauling, Nobel-prize laureate for science and for peace, multitalented scientist and political activist against nuclear proliferation, in 1968 recommended that babies carrying deleterious genes be tattooed on their forehead (Kerr & Shakespeare 2002). During the eighties, a Swiss doctor proposed that HIV positive people be tattooed on their sex (Gros 1989) and in the nineties a similar measure – this time by means of a more sophisticated magnetic signal – was proposed by a Swedish biologist for those who test positive for AIDS antibodies (Klein 1994). Still in the sixties, French biologist Jean Rostand expressed his wish that each baby be endowed with a standard DNA coding desirable physical and intellectual traits, so that they would not be *the offspring of a particular couple, but of the entire species* (cited by Rosenfeld 1969: 143). In the seventies, biologist and geneticist Theodosius Dobzhansky (Hayne 1976: 21) proclaimed that man had to *grasp the reins of evolution of his own and of other species* and bring into existence a superior humankind; but for the panel of scientists who met in those same years under the aegis of the Rand Corporation to discuss predictions as regards the future applications of reprogenetics, *such techniques will be used to create humanlike animals*

¹²⁴ a.k.a liberal eugenics

¹²⁵ A.V. Hill, Bulletin of the Atomic Scientists, VII (12), December 1951, pp. 372

("parahumans") to perform low-grade labor (Rorvik 1971: 102)¹²⁶. In his 1971 presidential address to the American Association for the Advancement of Science, Bentley Glass proclaimed that parents in the future will probably be forbidden to *burden society with a malformed or mentally incompetent child* (in Kass 2002: 128). It is useful to recall that a similar statement – *whoever is not bodily and spiritually healthy and worthy shall not have the right to pass on his suffering in the body of his children* – featured in Hitler's *Mein Kampf*. In a 1985 book significantly entitled "Progress or Catastrophe", Glass added that every couple should be allowed to have more than two children *only upon special evidence that the first two are physically and mentally sound* (Glass 1985). It is of some consequence that Glass was not unaware of the scientists' influence upon society. In 1981 (Glass 1981), he had authored a paper in which he acknowledged that the notorious "Baur-Fischer-Lenz" (1921), after the names of the authors of this genetics handbook that popularised the discipline with the German readership, proved to be instrumental to the crystallization of Hitler's thought on the subject of racial hygiene and eugenics. It is striking that this knowledge was not sufficient to refrain him from making such unguarded statements.

In 1973 geneticist James F. Crow urged policy-makers to *put restrictions on individual freedom this generation in order to have a lower mutation rate for the benefit of our posterity* (Karp 1976: 56). In 1974 Marburger human geneticist Gerhard Wendt submitted that the health of our children and of the future generations is in danger because of the increasing number of disabled people and that society should do something quickly about hereditary health (Reyer 1991). A couple of years later, Carl Jay Bajema, professor of biology, urged policy-makers to see that people be granted marketable licenses to have children, on the ground that more affluent people are, genetically speaking, better people (Ostheimer Nancy & John 1976).

It is sometimes hard to draw the line between naïve but well-intentioned advocacy on one hand and sheer disingenuousness on the other hand. In 1997 James Watson, Nobel prize recipient and co-author of the 1953 discovery of DNA's structure, contended that fetuses should be aborted when carrying genes for homosexuality and that Hitler did not err in regarding mental disease *as a scourge on society* (Kerr & Shakespeare, 2002: 105). Subsequently, he minimised the importance of demanding consensus from the public opinion because *it is none of their business. If there's a terrible misuse and people are dying, then you can pass regulations* (Stock & Campbell 2000: 84). Astonishingly, the leaders of present genetic research simply shut their eyes to the reality of facts. They dismiss the slippery slope metaphor because at the end of the day they say that they are just applying the same techniques employed by natural selection (Leroy Hood in Stock & Campbell 2000). But at the same time they suggest they ought to be very careful *not to admit at the outset [of a scheme of germline engineering] that we're three-quarters evil and a quarter good* (Watson). The reader should compare such a standpoint with Dostoevsky's Grand Inquisitor's candid admission (Dostoevskij 1912) that *deception will be our suffering, for we shall be forced to lie*. The rationale behind it has been illustrated by Watson himself. They are well-intentioned and they should only feel proud of *destroying the world's genetic patrimony* for the sake of human population. Ironically, like Camus' negative heroes, their revolt against fate turns into a revolt against nature (Braun 1974). But their initiatives are legitimated by their humanist commitment, for just as the Grand Inquisitor claimed that he loved humanity more than Jesus did¹²⁷, so genetic scientists *get a lot of pleasure from helping other people. That's what we are trying to do.* (Watson *ibid.*).

With respect to class-biases, Watson decries the middle class's reluctance to promote vast programmes of genetic engineering on the ground that theirs is mere selfishness (Stock & Campbell 2000). This is an ironic twist in the eugenic saga because most classic eugenicists belonged to the middle class (Bullen et al. 1984).

Delusions of omnipotence are exhibited by biochemist Daniel Koshland Jr., who declares that human cloning is not so problematic when he reflects that *if they had eight people just like me and we were all on the Supreme Court, it would really save the United States* (Stock & Campbell 2000: 27). A further instance of scientists' condescension towards popular culture has

¹²⁶ The following link presents the most recent predictions: <http://www.rand.org/publications/MR/MR1307/MR1307.sum.html>

¹²⁷ Dostoevskij's unpublished notes (in Kroeker & Ward, 2001: 139)

been reported by Emily Martin who attended the New York Academy of Sciences conference called "the flight from science and reason", a name that gave away the intents of its organizers. Here is her description of what happened:

Numerous speakers made plain their contempt for popular culture. Alternative medicine was said to be practiced by "fascists, autocrats, and bizarre magicians"; quoting Poe, Gerald Weissmann remarked that "conventional ideas are foolish"; and Sheldon Goldstein commented that we are living in a "new age of unreason" and that, among the public, "logical thought itself is in bad order". Most speakers seemed to agree: the public knows nothing.

Martin (1996: 44)

It goes without saying that such a position, when paired with the conviction that, because of their untutored minds, most lay-citizens are not even capable of governing themselves, let alone make wise and far-sighted decisions on collective issues, inevitably paves the way to a technocratic view of how decisions should be made (Zimmerman 1995). Finally, a telling paragon has been made by John C. Avise (Avise 1998) at the end of his scrutiny of the social repercussions of genetic research. Avise describes the behaviour of HAL, a supercomputer protagonist of *2001: A Space Odyssey*, which attempts to murder the members of a space mission when it realises that the mission itself could be jeopardised by human fallibility. Only one astronaut survives and neutralises it. Avise's comment is that *by aspiring to subordinate his human creators, HAL precipitated his own demise* (ibidem: 218), but his final contradictory conclusion is that he wishes his book could prove thought-provoking because, in the words of HAL, "*this mission is too important...to jeopardize*". No more realistic portrayal of a science-golem rebelling against its creators – mankind in its entirety – has probably ever been made.

This brief sketch of elitist speculations gone astray is indicative of the intimate relationship between a propensity to enhance and one to purge, between scientific asceticism and lust for power, and between love of humanity and disdain for ordinary human nature. These aspects are excellently exemplified by Dostoevsky's portrait of the Grand Inquisitor (1912):

if there's only one like my old inquisitor, who had...made frenzied efforts to subdue his flesh to make himself free and perfect. But yet all his life he loved humanity, and suddenly his eyes were opened, and he saw that it is no great moral blessedness to attain perfection and freedom, if at the same time one gains conviction that billions of God's creatures have been created as a mockery, that they will never be capable of using their freedom, that these poor rebels will never turn into giants to complete the tower, that it was not for such geese that the great idealist dreamt his dream of harmony. Seeing all that he turned back and joined the clever people.

The gist of the argument set forth by both Watson and the Grand Inquisitor is that they know better than the lay-people do, that their expertise entitles them to prescribe universally valid and applicable courses of actions, and that the way of Christ – the way of taking responsibility for one's own action – is not suited for the masses, who do not really know what to do with freedom since what they really seek is happiness. My guess is that the Devil's way, the one chosen by the Grand Inquisitor, and which allows ordinary citizens to escape from freedom and the attending uncertainties into authority, mystery and miracle, should sound particularly promising to Watson and his like-minded colleagues. Unlike Berman Marshall (Lash & Friedman 1992), I contend that it is not the State but biomedical science that has become the primary source of miracle, mystery, and authority. Sick and dissatisfied people are predictably inclined to believe that these cynical, paternalist spiritual guides are cognizant enough to make decisions on their behalf (Brody 1992; Hermanowicz 1998). In the main, by perusing the literature on scientists' understanding of progress and human betterment we arrive at two conclusions. One is that the Western struggling with evil, oppression, and the Absolute has often produced a *vast self-righteous hubris and inhuman callousness* (Talmon 1960: 514). The other is that oftentimes, like the unflinching rationalist Ludovico Settembrini and the nihilist Leo Naphta in Thomas Mann's *Magic Mountain* – a setting not dissimilar from the academic ivory tower –, self-styled clever people have in common a more or less explicit contempt for lay-people, and this is all the more true for eugenicists (Nelson 1980). Indeed, this is not the only affinity between the characterization of Mann's protagonists and the mindset of the above mentioned scientists. See, for instance, Mann's acute description of Settembrini's moral stance:

And this morality of Herr Settembrini's, what was it, what did it want? It was life bound, and thus entirely utilitarian; it was pathetically unheroic. Its end and aim was to make men grow old and happy, rich and comfortable – and that was all there was to it. And this Philistine

philosophy, this gospel of work and reason, served Herr Settembrini as an ethical system. As far as he, Naphta, was concerned, he would continue to deny there was anything but the sheerest and shabbiest bourgeoisism.

That feelings of condescension have never been foreign to eugenicists is witnessed by statements such as those made by the Scottish communist physicist J.B.S. Haldane in his "The inequality of man and other essays" (1932: 213):

I have not very much use for people who are not in touch with the invisible world [ideas, theories, theorems, scientific laws, postulates, etc.]. At best they are good animals, and too often not even that.

Karl Pearson, a socialist biometrician and mathematician, as well as a disciple of Galton (J. Schwartz 1992), in 1883 maintained that:

to bring again to the fore a feeling of genuine respect for personified society, the State, is obviously a hard but primary necessity of socialist action. We must aristocratise as we democratise; the ultimate appeal to the many is hopeless unless the many have foresight enough to place power in the hands of the fittest.

An elitist view of society was also espoused at the beginning of the twentieth century by American biologist David Starr Jordan who conveniently held that *It is not the strength of the strong, but the weakness of the weak, which engenders exploitation and tyranny* (as quoted by Finzsch in Kaupen-Haas & Saller 1999).

This outlook has never been uncommon among scientists in general (Longhi 1997), and eugenicists in particular (Mazumdar 1992), and is typified by the way Jewish physician Berthold Stauber¹²⁸ addresses his father in Arthur Schnitzler's "The Road to the Open" (1908). After being reproached by his father that it is not only technical proficiency that makes a good physician but also kindness and love of mankind, Berthold replies that, to him, pity is tantamount to weakness, and in hard times one must have no scruple in sacrificing the individual if the common good demands it:

You need only consider that the most honest and consistent social hygiene would have the direct result of annihilating diseased people, or at any rate excluding them from all enjoyment of life, and I don't deny that I have all kinds of ideas tending in that way which may seem cruel at the first glance. But the future, I think, belongs to ideas. You needn't be afraid, father; that I shall begin straight away to preach the murder of the unhealthy and superfluous. But theoretically that's certainly what my programme leads to.

In fact, it stands to reason that all claims of superior knowledge tend to foster anti-democratic feelings (Glatzer 1997), regardless of the legitimacy and authoritativeness of the claim. The inevitable self-perception of all professionals as the chosen few, selected by their informed peers through an assessment of their merits and not by chance or favouritism, goes to show that there indeed exists an elective affinity between eugenics and professionalism (Watts 1994). Additionally, the unfeasibility of true popularisation, paired with a sense of self-complacency, make for a considerable distancing of its practitioners from the "consumers" and "users".

This mindset appears to work subtly and unpredictably, affecting even the most clear-sighted among scientists. A case in point is the unintentionally offensive remark of Theodosius Dobzhansky, an otherwise remarkably objective commentator of issues concerning science and its impact upon society. Dobzhansky, on seeking to offset the disdainful attitude of the scientific elite towards the population, reminds them that people *are not just manure in the soil in which are to grow the gorgeous flowers of elite culture, and that it is imperative that there are a multitude of climbers. Otherwise the summit may not be reached by anybody. The individually lost and forgotten multitudes have not lived in vain, provided that they too made the effort to climb.* Mary Midgley (Midgley 1985: 58) aptly points out that this metaphor of the ascent betrays the disavowal of Kant's principle that people are ends in themselves. The symbolical connection between high culture and mountainous heights cannot be denied. In point of fact, mountain-scaling was a romantic trope that in the hands of the British intelligentsia symbolised intellectual superiority and high endeavour (Carey 1992). And when American geneticist A.H. Sturtevant in 1954 pleaded society to embrace racial diversity because this would prove decisive to the advancement of civilization, he inadvertently demonstrated that even an anti-eugenics stand could be profoundly informed by the same fixation with "compulsive progress" – the climb of the evolutionary ladder – that characterised eugenicists.

¹²⁸ Curiously resembling Turgenev's nihilist physician Bazarov in "Fathers and Sons" (1865)

On the other hand, selective Darwinism became popular among bio-medical professionals owing to their self-proclaimed mental and physical superiority, the core of an aristocratic view of the societal arrangement (Weindling 1989). In this respect, I have previously referred to certain declarations made by Nietzsche – an eager hiker himself – that would lead one to believe that he might have sympathized with the eugenicists' aims. Like many of his contemporaries he was deeply worried about the future and the degeneration of mankind:

everyone who has the rare eye for the overall danger that "man" himself degenerates; anyone who, like us, has recognized the monstrous fortuity that has so far had its way and play regarding the future of man...suffers from an anxiety that is past all comparisons.

Beyond Good and Evil (1886: sec. 203)

He did not hesitate to attack democratic institutions, guilty of undermining man's will to power and making him weak and hedonistic (Detwiler 1990). Accordingly, he felt compelled to pose the problem of

what type of man shall be bred, shall be willed, for being higher in value, worthier of life, more certain of a future. Even in the past this higher type has appeared often – but as a fortunate accident, never as something willed.

The Antichrist (1895: sec. 3)

For only the greatest of human beings could redeem the rest of mankind now that God was dead and hopes for an otherworldly redemption no longer obtained. But this conclusion means that the existence of ordinary, all-too-human individuals have no intrinsic value if not in relation to the prosperity of the overmen. Thus he wrote:

Mankind in the mass sacrificed to the prosperity of a single stronger species of man – that would be an advance.

On the Genealogy of Morals (as quoted by Detwiler 1990: 107)

The significant aspect of Nietzsche's thought is that he has been one of the most precise gauges and trendsetters of fin-de-siècle Europe's cultural climate and a prophet of the contemporary predicaments. He has best expressed bourgeois dissatisfaction with the way power was wielded by those who inherited it instead of acquiring it, by attacking both utilitarianism and altruism as harmful to the interests of the better endowed (Hale 1971). He also has given shape to the fears of the member of the upper classes who thought the degeneration of the "herd" was self-evident (Stone 2002). At the same time he also charmed the champions of a technocratic administration of society with statements such as this (Reichel 1994: 138):

Ich versuche eine ökonomische Rechtfertigung der Tugend. – Die Aufgabe ist, den Menschen möglichst nutzbar zu machen und ihn, soweit es irgendwie angeht, der unfehlbaren Maschine zu nähern

[I seek an economic justification of virtue. – The task is, to possibly render men useful and to bring man, if that is in any way possible, closer to the condition of infallible machine].

And yet Nietzsche's views cannot be confined to that period. John Carey (Carey 1992) has in my view persuasively outlined the principal attributes of this modernist phobia towards the lower ranks of society. Such an eliminationist doctrine was essentially built around the idea that the massification of culture imperilled the supremacy of the higher men (Nietzsche's Will to Power) on account of their vulgar and prosaic taste and habits (Yeats). I suspect that these philosophers and writers would not have expressed such feelings unless they believed that a majority of their peers would not feel ashamed. This impression is confirmed by Carey's remark that the dehumanisation of the proletarian masses, accompanied by dreams of mass extermination and sterilization, served as a refuge for early twentieth-century intellectuals who were afraid of their unrestrained sexuality, mundane interests, and reluctance to become the agents of their own emancipation as well as the protagonist of a global social reform.

The reader should be able to appreciate the relevance of this latter argument in the light of my previous description of the transformation that the thought of Alfred Ploetz underwent on beholding the degradation of those utopian

communities in the United States about which he had formed the greatest expectations. As he turned from utopian socialism to racial hygiene, so a great many progressive intellectuals resolved that the problem with the proletariat was less spiritual idleness than biological defects.

The pervasiveness of such anti-humanistic attitudes have been impressive indeed over the past century, and even today we should not feel confident that it will be fenced. According to Brian Morris (Morris 1985: 724), *behaviourism, Durkheimian sociology, sociobiology, structural Marxism and Lévi-Straussian structuralism...have much in common in their repudiation of the human subject*, in that they all posit a subject-object relationship in instrumental terms (Rasmussen 1996). It is alarming to find that an analogous support for an instrumental understanding of human life is held by contemporary advocates of utilitarianism within the bioethical community¹²⁹ (Teichman 2001). It is not a matter of presuming the existence of supernatural beings to make sense of our outmoded convictions, but of historical evidence that proves that whenever this challenge has been made humankind has failed to live up to its own expectations (Teichman 2001: 156):

if human life itself is not an ultimate value how can human beings give value to other things? How could something of non-ultimate or secondary or merely instrumental value understand or create any primary values? ... such an attitude is self-destructive and unnatural.

That such utilitarians could think of themselves as humanists is hardly surprising when one considers that a significant measure of anti-humanism was inherent in the humanist school of thought. Humanists were members of the upper classes and shared the prejudices of their peers (Zilsel 1942), so that an emergent anti-humanism could feed upon the humanistic distinction between the liberal and mechanical arts, and the subsequent devaluation of the latter. My impression is that, no matter how questionable it is, this type of discourse is nowadays being channelled into the dreams and worries surrounding biotechnologies.

Finally, the time has come to gather up the threads of my argument. Above all, we must have regard to the context in which eugenics and genomics have developed. Modern eugenics emerged as a bourgeois response to the advent of an unprecedented age of massification. Mass-culture was seen by the literate elite as the triumph of cultural mediocrity and by the eugenicists as a sign of biological mediocrity (Weingart et al. 1988; Herman 1997); and post-liberal thinkers accepted the premiss that modernity was tantamount to degeneracy and decay (Herman 1997).

The Post-WWI period marked the acme of the Counter-Enlightenment movement. The Great War generated a climate of messianic expectation but also peddled nihilism, superficiality, indifference. A new age of harmony, peace, and well-being, that immediately after the war seemed imminent, was continually delayed. Frustration, disheartenment, anguish and negativism cropped up and sapped the strength of ethical behaviour; while some withdrew into themselves, many idealists, on the contrary, were drawn into radical thought and action. The latter countered the essential Enlightenment dogma of the progressive improvement of the human condition through science and technology, invoking the ineluctable decadence of every civilization, and seeing the contemporary epoch as a phase of regression which would usher in the fall of Western civilization¹³⁰. In the artistic field, Dadaism and Surrealism mirrored this incertitude and despondency. "Dadaism", a term which was coined after the sound of a child's babble, preached the *deliberate renunciation of thought and expression* (Salvatorelli, 1957: 661). A Dadaist manifesto was put up in Paris at the outset of the 1920s; it read:

Plus de peintres, plus de littérature, plus de musiciens, plus de sculpteurs, plus de religions, plus de républicaines, plus de royalistes, plus d'impérialistes, plus d'anarchistes, plus de socialistes, plus de bolcheviques, plus de politiques, plus de prolétaires, plus de démocrates, plus de bourgeois, plus d'aristocrates, plus d'armées, plus de police, plus de patries, enfin assez de toutes ces imbécillités, plus rien, rien, RIEN, RIEN, RIEN.

¹²⁹ Among others, Peter Singer, Helga Kuhse, Ronald Dworkin, Margaret Pabst Battin, Jonathan Glover, John Harris.

¹³⁰ Several are the flaws imputed to democracy: inclination to compromise and negotiation; tolerance, pluralism and relativism; the universal suffrage. (Bobbio in Fini 1976).

Salvatorelli (ibidem)

"The hollow Men" (1925), by Thomas Stearns Elliot¹³¹, is another telling manifestation of the abyss of debasement into which the leading thinkers held contemporary humanity to have fallen:

We are the hollow men
we are the stuffed men
leaning together
headpiece filled with straw

This poem has been described as an indictment of scientism (Waggoner 1943) and its delusions to the effect that rational causation is the key to the solution of the human plight; that science is not depreciating and desiccating the meaning and mystery of life; and that science-based doctrines are existentially fulfilling.

Moral anarchy issued from this alleged failure of Western civilization to meet with the minimal requirements of a decent human life. Surrealist authors proclaimed that: *nos héros sont Violette Nozière la parricide, le criminel anonyme de droit commun, le sacrilège conscient et raffiné* (Aragon quoted by Salvatorelli, ibidem: 877), and invited mankind to reject reason in favour of the automatism of impulse, of revolution for revolution's sake. Enlightenment yielded ground to the Romantic heritage, rejecting out of hand the foothold of rationalization, *Entzauberung* (disenchantment) and, ultimately, democracy itself. Norberto Bobbio (Fini 1976) suggests that this aversion to democracy ensued from the growing conviction that democracy replaces *the heroic with the utilitarian, the sublime with the vulgar*, being a sort of *betrayal of the spirit; a corruption, degeneration, decay of that civilization that ennobled Europe*, and it is *responsible for the enfeeblement and mediocrity of life*. More, the appeal of a doctrine promoting faith and instinct and disregarding history directly anticipates the omnipresent fascist motto: *believe, obey, fight*.

The repugnance for what is mediocre, inferior, deviant, and erratic is thus the hallmark of most of the ideologies that oppose the thorough humanization of science and medicine – eugenics, scientism, totalitarianism, racism, anti-Semitism, etc. What the followers of such doctrines have in common is the fear of unpredictability, of the capriciousness of human existence, of the absurd, whose most perfect embodiment was the proletariat. According to Bertrand Russell, the fetishism of the essence (essentialism) precisely stems from this quest for a psychological safe haven staving off the danger of arbitrariness and uncertainty (O'Malley & Painter 1994). Where does this repugnance come from?

Martha C. Nussbaum once rightly remarked that the most patent flaw of Nietzscheanism is that it overlooks the all-important fact that people who have no shelter, no medical insurance, and barely enough food to survive are most unlikely to achieve a publicly acknowledged greatness. The privilege of affluent people is to be in a position to think free from the constraints constituted by the basic necessities of life, for our intellectual capacities depend on our physical capacities and conditions. Likewise, for Nussbaum self-command and self-regulation thrive when our basic needs are fulfilled and Nietzsche's scorn for the socialist agenda derived from this fundamental misapprehension: that besides *bourgeois vulnerability* – loneliness, melancholy, bad reputation, some kinds of sickness, etc., which are all compatible with doing philosophy – there exists a *basic vulnerability*, i.e. *the deprivation of resources so central to human functioning that thought and character are themselves impaired or not developed* (Nussbaum in Schacht 1994: 159).

Such a fear is so intense and deeply rooted in these élites' perception of things, and in the way they interact with lesser human beings, that they sometimes sacrifice love and compassion for the sake of self-discipline and the unlimited control over the contingencies of the natural environment and of the social milieu. In other words, they can afford to

¹³¹ *The Hollow Men* is both a characterization and a repudiation. Modern secular man performs his idiotic dance, his head filled with straw, because he has rejected revelation for science, because he has ignored the other world in order to try to make the most of this (Waggoner 1943: 102).

ponder, but they cannot afford the luxury of accepting their own finitude, and acting compassionately towards their fellow human beings. In Nussbaum's words, they do not know how to be "porous" to what surrounds them. And when science is viewed as a revolt against the absurd (abnormality) and against death, the Grand Inquisitors offer worldly bread in exchange for depriving them of freedom. Likewise, eugenicists promised future rational economic actors an assortment of gifts ranging from civilisation, discipline and order, to harmony, health and happiness, all in exchange for sexual restraint, hygiene, and the control over procreation (G. Jones 1986).

Les hommes meurent et ils ne sont pas heureux [Men die and are not happy]. These are the words spoken by Camus' Caligula on reflecting upon the death of his beloved sister, and those are the words that push him on the road to tyranny. Caligula is the embodiment of the universal temptation to choose a rebellious despotism over the nihilistic experience of senselessness (Sprintzen 1988). The rebellion against the experience of the absurd, an experience more piercing in a disenchanted world, leads to iniquity. But are not scientists rebels against the absurd and the unknown?

such a world may make sense scientifically. Einstein maintained that God does not play dice with the universe. The laws governing it may be perfectly rational in terms of cause and effect. Their reliability is indeed essential to the work of the applied scientist. To the microbiologist, the bacillus of the plague is no more and no less irrational than the DNA code. It is only when you bring in concepts such as right or wrong, good, and bad, advantage and drawback, benefit and harm, sin and righteousness, that the problem begins. It is then very tempting to use the word "absurd" to describe a world in which plagues exist.

Philip Thody (1989: 47)

Debarati (2000) correctly points out that the way Camus ties up the rebel's need for coherence and unity, considered as a vehicle of mastery over the unknown, with the exclusionary and eliminationist paradigm underpinning modern political and philosophical messianism, complements and reinforces Benjamin's contention that totalitarianism also stems from the estheticization of politics. Equally of an aesthetical nature appears to be the scientific propensity to simplify and essentialise reality – what we call biological and chemical reductionism and determinism¹³² – and, by doing this, to feel entitled to claim, with a sense of finality, that ultimate solutions to the human predicament are at hand.

A misguided notion of science as a redemptive mission is mirrored in Camus's "La Chute" by Clamence's attempt to assuage his feeling of guilt for not rescuing a drowning woman. The doctrine of absolute culpability that typifies the coward (La Chute) as well as the assassin (L'Homme Révolté) and presupposes that no one is truly innocent (Viggiani 1960) is not foreign to certain rhetorical explanations of how bio-medicine ought to deal with the "problem" of disability and mental retardation. Because what are these defects (sins?) if not the lowest point reached by humankind since its fall from grace (Davis & Anderson 1983)? And what is science if not the most virtuous means to re-attain that previous, ennobling state?¹³³ For John Scotus Erigena technology was eminently virtuous because it would restore humans to the condition they enjoyed before Adam and Eve ate the forbidden fruit. More recently, Leon Kass (1985: 34) claimed that

the implicit goal of biomedical technology – indeed of the entire project for the conquest of nature – could well be said to be the reversal of the Fall, and a return of man to the hedonic and immortal existence of the Garden of Eden¹³⁴

¹³² See for example Nancy Wexler's account of what she experienced as she was bidding farewell to the subjects of her inquiry into the genetics of Huntington disease in Venezuela (Andrew Revkin, "Hunting down Huntington's", Discover 14, 12 (1993): 108): *As she waved at ["old friends"] and smiled, she says she couldn't help but visualize on their faces the broken-record repeat from the plates back in the laboratories, like the shadows cast by a Venetian blind. Everywhere she looked, the tri-nucleotide stutter looked back, digging in its persistent mystery. "I had spent so many years being so curious about what it was studying all these people whose bodies contained the mystery", Wexler says. "And suddenly it was superimposed on them, almost like a silk screen. It was an image without words, saying "Here's the answer. And here's another question".*

¹³³ It is worthy of note that Nordic Lutheranism calls the original sin *arvsynd*, which, like its German equivalent, *Erbsünde*, conveys the idea of the heritability of sins and the concomitant futility of probing someone's innocence (Colla 2000).

¹³⁴ By contrast, the fall of the Grand Inquisitor consists in *cette prétention d'être à soi-même sa propre autorité, de commuer la responsabilité métaphysique dont nous héritons en responsabilité morale que l'on pourrait se vanter d'avoir acquise, c'est précisément ce qui nous fait passer de la chute originelle, dont la responsabilité métaphysique est la trace en nous, à la seconde chute, qui prolonge indéfiniment la première* (Van-Huy, Ngoc-Mai, 1974: 205)

Analogously, in the eyes of the protagonist of *The Fall*, such an aesthetic, transcendental longing is unquestionably bound up with the characteristically bourgeois desire for purity, harmony, homogeneity, conformism and cleanliness, namely for the liquidation of abnormality and alterity. His stance is epitomised by later allusions to the Final Solution as a “huge laundering venture” and to the communist purges as *épurations* (Debarati 2000). This age-old dream, that could come true thanks to contemporary techno-science, hinges on the key assumption that either there is no such thing as human nature or that it is somehow infinitely malleable (*L’Homme Révolté*). For Camus this is, ultimately, Ivan Karamazov’s conclusion on confronting the senseless character of the divine creation. If God does not exist, then the objective of a rebel against this godless creation will be to pursue a higher principle, that of justice: *they want justice where fate or genes or both has denied it. They revolt as Job did—“The Lord denies me justice!”—but they do not look where Job looked for an answer* (Cohen 2003)¹³⁵

Yet, just like Victor Frankenstein’s intellectual faculties are betrayed by his obsession with the thorough secularization of the world (Haynes 1994), it is this search for absolutes that eventually ruins Ivan. Endowed with a mind of this world, neither realises that the goal of reconstructing creation, entailing the establishment of the sovereign divinity of humankind, is anything but just:

Moral questions and issues...are neither abstract nor intellectual; and it follows that habits of thought cultivated in ivory towers are not necessarily the ones most appropriate to the discussion of them.

Maclean (1993: 203)

¹³⁵ <http://www.thenewatlantis.com/archive/3/cohen.htm>

6. CAN SCIENTISTS PLAY A LIBERATING ROLE?

Is this momentous marriage selection, from motives half rational, half mystical, in their veneration of the continuance of life, to prevail in spite of popular ignorance and passion? Or, leaving this question of practicability for experience to decide, is it after all sensible to burden the present generation with concern for generations of the future whose needs we can hardly foretell; and, in subservience to the science of the day, to repudiate instinct older than all human experience by "falling in love intelligently"? We have need of a social philosophy to tell us how far eugenic reforms are reasonable and worth while.

J.A. Field, eugenicist (Field 1911: 61)

Everybody has his blind spot or his Achilles's heel, and scientists are no exception. Many of them believe they are impartial in their thinking and uninfluenced by their surroundings. Some are very egoistic, and put forward ideas that they feel the whole human race has got to bow down and accept. Others might be excellent in one area of science — astronomy, for instance — yet believe that have insights into all fields, without an awareness of the pitfalls. Scientists are human — they're as biased as any other group. But they do have one great advantage in that science is a self-correcting process

Cyril Ponnampерuma (Weintraub 1984: 14)

The lid was off... Those great and little scientific minds, engaged hitherto in searching for abstract truth or in multiplying the richness of life and the wealth of nations, could be turned toward the invention of means of destruction whether they wished or not

Will Irvin, World War I correspondent, on gas warfare (Slotten 1990: 488)

To recapitulate, these are the issues that I have analysed thus far and which scientists, intellectuals, social and political activists, and ordinary citizens should carefully consider:

MISPLACED PROGRESSIVISM. We have seen (2.3) that, after Germany and the United States, Scandinavia and Canada have the worst record with respect to the violation of human rights in the implementation of eugenic policies. Swedish politicians and biomedical scientists justified those measures by claiming that the interest of the community must always prevail over the individual interest (Colla 2000). Retrospectively, a Swedish doctor commented: *all of us thought like that... we dreamed we could improve human body and soul... That's how the geneticist saw it then and some of them see it still today* (Clarke 1994). In Canada the most extreme eugenics policies were advanced by progressive and scientifically minded groups rather than by conservatives (McLaren 1986; 1992). That was also true for several other countries (Pickens 1968; Freedman 1979; Paul 1984). There actually seems to be some sort of linkage between utopianism, scientism and the new-age ideal of self-transformation through conscious evolution (Deery 1996) that is, after all, the gist of eugenics. Perhaps the encounter of the radical disillusion in the capacity of people born unequal to bridge the gap and reaffirm the validity of egalitarianism and the underlying sense of frustration with the minutiae of laboratory life explains such a relation:

It was very different, when the masters of the science sought immortality and power; such views, although futile, were grand; but now the scene was changed. The ambition of the inquirer seemed to limit itself to the annihilation of those visions on which my interest in science was chiefly founded. I was required to exchange chimeras of boundless grandeur for realities of little worth

Victor Frankenstein (N. Crook 1996: 32)

DISCIPLINED RATIONALITY, UTILITARIANISM, SCIENTISM, AND BIO-POLITICS. In Weimar Germany a most advanced network of marriage- and sex-counselling centres was established, whose voluntary nature was entirely compatible with the new, democratic constitution (Usborne 1992). But two major economic crises in 1925 and 1929-1930 brought about a paradigmatic shift. Cost-containment and efficiency considerations stressed the importance of orderly behaviour (Hong 1998), social control of reproduction, and the primacy of prevention over care that is, of biology and genetics over medicine (Massin 1990). Kevin Repp (2000) has called this attitude to social issues "disciplined rationality"

and imputes the comparatively rapid nazification of Germany to its widespread success among conservative as well as progressive and feminist thinkers. As the curtailment of individual freedom on account of the pursuit of communal well-being could not be undertaken without professional advice, health- and life-scientists, counsellors included, became deeply implicated in the subsequent terrible developments.

Historians who have examined medical encyclopaedias for the second decade of that century conclude that physicians descended upon sinners like deities to stop them from falling off the precipice. "We are responsible", the editor of the English medical journal The Lancet proclaimed in 1819, "for the employment of our peculiar authority in promoting the purification and well-being of human society". Physicians came to see themselves as guardians of the people's health and morals.

Mosse (1982: 226)

ELITIST SELF-RIGHTEOUSNESS AND CONDESCENSION: the white ruling class of puritan countries came to think that the pursuit of order and happiness could justify the exclusion of the non-white, non-Protestant, deviant and unfit Other. The New Man that was to arise out of this major social reform would be an uncorrupted, extra-ordinary, aesthetically and ethically sublime version of them (Mosse 1978). Eugenics is how this project was christened. The definition of human nature in aesthetic terms and the legitimating rationalization of such modernist schemes were indispensable to camouflage the fear and abhorrence that some intellectuals and scientists felt towards the bestial masses that, being uneducable, would remain deficient and resist the rightful claims and the ingenious plans of social engineering of the enlightened upper classes (Carey 1992). The ultimate goal was the dehumanisation of those whom the intelligentsia deemed abnormal and beyond the pale, mere raw material that could and should be purged (Stone 2002: 71):

Dreams of purification, cleansing and health and the aesthetic modelling of human beings are common and old ones

BIOLOGICAL AND GENETIC ESSENTIALISM. The evidence shows that the abstraction and hierarchisation of distinctive cultural and physical traits into absolutes altogether divorced from reality but not perceived as fictitious is responsible for the most tragic pages of the history of human civilization. Possibly infatuated with the law of excluded middle, according to which A cannot be non-A, scientists have repeatedly nourished such false beliefs through their biased truth-claims about the inborn essential attributes and differentiations among races, classes, and genders (McPhail 2002). They had to be aware that in so doing they were not only endorsing but also actually reinforcing iniquitous social structures and power-relations (Gould 1981; Lewontin 2001).

Socrates: Citizens, we shall say to them in our tale, you are brothers, yet God has framed you differently. Some of you have the power of command, and in the composition of these has mingled gold, wherefore also they have the greatest honour; others he has made of silver, to be auxiliaries; others again who are to be husbandmen and craftsmen he has composed of brass and iron; and the species will generally be preserved in the children... An oracle says that when a man of brass or iron guards the State, it will be destroyed. Such is the tale; is there any possibility of making our citizens believe in it?

Glaucon: Not in the present generation; there is no way of accomplishing this; but their sons may be made to believe in the tale, and their son's sons, and posterity after them

KALOKAGATHIA: The above mentioned predilection for absolutes is bound up with the notion of kalokagathía, the wedding of aesthetics (kalós, beautiful) and ethics (agathós, virtuous). Eugenicists repeatedly identified physical beauty and hereditary fitness (Branson 2002) but, like phrenologists before, some also argued that a beautiful complexion reflected someone's inner virtues. For them virtues were innate and could not be really taught. This view, epitomised by the Latin saying *mens sana in corpore sano*, originated in Greece and became quite popular in Athens during the 5th century B.C. There it was employed to prop up the political aspirations of the new Athenian bourgeoisie and imposed a lifestyle typified by a permanent effort to outshine oneself and the others (Bourriot 1995). Long after the original formulation, German romantics resumed and re-interpreted kalokagathía in order to shape ideal citizens for a nation that would revive the glory of ancient Greece, and eugenicists simply added the authoritativeness of science and the linking of social utility and the hierarchization

of beauty as a measure of biological fitness to a belief that was deeply ingrained in the collective unconscious (Essed & Goldberg 2002). Thus Haeckel (Vandermeer 1996: 27):

...It is of the first importance that modern science not only shatter the false structures of superstition and sweep their ruins from the path, but that it also erect a new abode for human emotion...the Trinity of "the true, the good, and the beautiful"

In these concluding chapters I describe the reasons that lead me to think that even conscientious scientists will find it hard to avert the potential misuse of truth-claims and attendant value-judgements made in the name of science.

6.1 A SCIENTIFIC MINDSET?

You believe in the mission of mankind, don't you, Kelvin?...Just don't go to the lab, if you don't want to lose your faith. It belongs to Sartorius – Faust in reverse...He's looking for a cure for immortality! He is the last knight of the Holy Contact, the man we need. His latest discovery is pretty good too...prolonged dying. Not bad, eh? Agonia perpetua...

Lem (1970: 42)

My proclivity for super dreams had clearly long worried Betty [Watson's sister] who feared that I would never adapt successfully to the world of ordinary people

Watson (2002: 11)

Cet angélisme scientifique relève d'une répugnance profonde d'origine philosophique et même religieuse à admettre que le vrai puisse coexister avec l'arbitraire, peut-être même s'enraciner dans cet arbitraire

Girard (1972 : 320)

Vaughn-Blankenship (1973) correctly observes that to become a scientist encompasses a wide range of teachings about what the attributes of the ideal scientist are, how scientists are expected to interact with their colleagues and lay-people, deal with their work, and evaluate their own performance and that of their colleagues.

His data point to the intriguing characterization of scientists as civically-minded, socially and politically engaged citizens who are at once positively persuaded that the use or abuse of science is none of their business. Vaughn-Blankenship's survey also reveals that around 40 percent of the respondents selected "frequently" as the most appropriate answer to the question "how often do you get as worked up about something that happens in political or public affairs as you do about things that happen in your professional life?". Three-fifths regularly talk about politics and social issues, mainly with their colleagues, but not exclusively with them. Their involvement in public issues ranges from voting, taking part in political rallies, supporting candidates by volunteering during their campaigns or through monetary contributions.

As a group they appear, in a sense, to be almost "ideal" citizens – highly educated, well integrated into occupational and family structures, participants in rather than merely observers of public events, making their choices on the basis of reason rather than partisan identifications

Vaughn-Blankenship (ibid. 284)

Elliott, Hood, and Holmes produced analogous evidence in 1972 through their survey of American scientists and engineers in the American South (Elliott, Hood, Holmes 1972) and concluded that their unusually high level of participation in the political life of their communities and their country should be related to their receptivity to social change that is a fundamental component of their open-minded and dispassionate outlook on reality. There is indeed no want among them for scientific optimism. Biologists Nossal and Coppel (1989: 154) maintain that among bio-scientists there is *an excitement and an elation that is barely containable*. The pity is, enthusiasm is not an antidote against misconduct. Dr. S., a former Nazi physician, noted that *the great enthusiasm that carried through the developments between 1933 and 1939 cannot be denied. Everybody wanted to contribute*. (Lifton 1986: 29).

Elliott, Hood, and Holmes (op. cit.: 425) additionally suggested that, drawing on the results of other surveys showing that better educated subjects display a more optimistic and reforming attitude, *in all probability the changes they [scientists and engineers] contemplate are not the kind that would seriously undermine their professional and social standing.*

A relevant consideration is what other social surveys can tell us about why scientists undertake such a career, that is to say, what kind of emotional drive and aspirations bring them to choose a field where high competition will most likely crush their hopes for recognition and their idealism?

Bernard H. Gustin (Gustin 1973), spurred by statistical correlations that showed that only a tiny number of scientists actually publish most and the best scientific papers, while at least 50% of them are virtually ignored, did such a survey and asked himself the same question. He first noted that Gaston's study of the British high-energy physics community identified as personal enjoyment the most common reason for their commitment to scientific research (47%), whereas only 28% cited career as the chief motivation. Incidentally, this conclusion agrees with my observations and with Carl J. Sindermann's serene analysis of the average scientific career (Sindermann 231-232):

immortality, or at least its temporary equivalent is probably an illusion for most of us. If we look dispassionately, especially near the end of a career in science, at our lasting contributions, they often seem insignificant or even non-existent

It is self-evident that most scientists, however hard they try, will never earn fame. Some come to terms with this awareness and regard their endeavour as a little contribution to a greater, collective effort (Klein 1994). Others fail to acknowledge their limits and may fall prey to enticing but pernicious political doctrines that promise fame and popularity. This was Merton's conclusion as regards his analysis of anomie (Bryant 1990), the deviant behaviour that would follow the cleavage between collective goals and individual expectations when society restrains the access to the means by which such goals could be attained and such expectations could be met. Anomie is probably an inevitable outcome of the unlimited expectations that nearly everyone attaches to science. A few assertions made by American physicists interviewed by Joseph C. Hermanowicz (1998) can make plain the matter at issue:

I had been trained to expect a certain class of jobs and also been trained that if I did not attain that class of jobs, that that was unacceptable or to be looked down upon (p. 75)

you replace one anxiety with another. First of all I had [a] survival anxiety. Now I have the anxiety that I'm given this remarkable opportunity very few people in history have had, that is, to work for some major research university with a secure position. I have no excuse really. If I don't do something really good it's because I wasn't smart enough (p. 90)

at the bottom there is this terrible fear that I will never think of anything ever worth doing, that I've published my last paper (p. 156)

I think that there are lots of really super people that don't realize that they are super. There are really excellent physicists who are still neurotic and anxious and worried about their image (p. 160)

Hermanowicz's analysis somehow reflects my own conclusions as concerns the elitist frame of mind of so many eugenicists. He underscores that scientists, like any members of a professional category, for all the arrogance they may display when it comes to pursue a specific intellectual agenda, need to be constantly reassured about their self-worth. As a result, some, regardless of their renown and accomplishments, just cannot find gratification in their accomplishments. This is the case of Subramanyan Chandrasekhar, Nobel Prize Laureate in Physics:

I don't really have a sense of fulfilment. All I have done seems to be not very much... Science at the present time is greatly associated with haste and the desire to be at the top. But my unhappiness or discontent is not due to that, I think. Perhaps it's because of the distortion, in some sense, of my life, of it's one-sidedness, of the consequent loneliness, and my inability to escape from it all. [...]. I felt when I was young that when one reaches the age of mid-forties or fifties and one is moderately successful, one would have a sense of personal security and assurance combined with some contentment. I certainly haven't found them. [...]. It's not at all clear to me whether the single-minded pursuit of science at the expense of other, personal aspects of one's life is justifiable. Not so much for oneself, but particularly for those with whom you are associated. The person who suffers the most is, of course, one's wife. [...]. So if I continue to do science it's largely for my personal pleasure, and also because I do not know what else to do... I've got so used to a certain way of life, that it's difficult to change... You can have your life go by.

Quoted in Hermanowicz (1998: pp. 170-172)

Although I posed no direct question on this subject, I am under the impression that none of my respondents is interested in achieving fame and success. They simply wish to carry out successfully the kind of research they have started. Reputation and pecuniary retribution were mainly seen as spin-offs of fruitful inquiries and nicely crafted experiments. Correspondingly, most denied that they are after the material benefits of industrial science. There simply is no telling of the sense of frustration and embitterment that an Italian food scientist (2002) felt once he had to resign himself to abandon his attempts to pursue an academic career – allegedly due to the incompetence of a supervisor and the disorganization of the foreign lab where he was working. These are his words:

Io, pur sforzandomi, non riesco ad entrare nell'ottica dell'industria dove quello che conta è, giustamente, la carriera. Intendiamoci, questo è giusto perché uno lavora per migliorare se stesso e la "promozione" dovrebbe certificare ciò, purtroppo però quello che io noto è una concezione del careerismo basata sulla conoscenza di "qualcuno che conta", sul ruffianarsi i superiori, e nel mettere in cattiva luce il collega per ottenere dei vantaggi. L'interesse per l'azienda e soprattutto per quello che fai passa sempre e comunque in secondo piano. Io non sono così, e non potrei mai esserlo perché va contro il mio modo di intendere il lavoro. Ingenuamente io penso che "fai il tuo lavoro e fallo bene perché qualcuno lo noterà" valga ancora, ma ciò non è vero soprattutto nell'azienda (ciò spiega l'imbarazzante incompetenza di alcuni personaggi a livelli gestionali estremamente elevati, con tutto quello che ne consegue), mentre io penso che nel mondo accademico non italiano valga ancora il concetto che quello che puoi guadagnare è solo la stima di chi, come te, lavora per la gioia di fare ciò che più gli dà soddisfazione senza doversi porre il problema di quello che guadagna il collega dell'ufficio accanto. Con questo non pensare che io non sappia che anche nel mondo accademico non vi sia l'arrivismo e l'invidia, ma sono eccezioni, semplicemente perché, di solito, chi ha fame di soldi non sposa la causa del "piuttosto perze sul sedere ma fare ciò che uno ama". Io sì, ecco perché voglio fare lo scienziato

[however hard I try, I can't adapt to the needs of the industry, in which what really matters is - fair enough - your career. Don't get me wrong, this is reasonable because someone works to improve himself and the promotion should attest that. However what I notice is a conception of career-advancement based on your acquaintance with "the big shots", on sycophancy, and on putting your colleagues in a bad light for your own benefit. Your company and what you are doing at no time become your priority. I am not like that and I could never become like that because it goes against my understanding of work. Naively, I still believe in "do your job and do it fine and someone will notice it". But this is not true especially in a company (this accounts for the embarrassing incompetence of some at the executive level, with the predictable consequences), whereas I think that in the Italian universities it still holds true the concept that what you earn is the esteem of those, like you, who work for the sheer enjoyment of doing something that it is truly fulfilling without having to mind about the income of your colleague working in the office next to yours. Mind, I am not unaware that in the academic environment it is not careerism and envy that lack. But they are exceptions, simply because, as a rule, money-thirst people do not espouse the cause of "better scraping a living if one can do what he likes". I do and this is why I want to be a scientist]

Such an admission faithfully reflects the idealistic image of science as a way of life and a source of happiness, gratification, and wisdom (Gustin 1973), the same endorsed by several eugenicists (Farrall 1985). Gustin (op.cit.) identifies charisma as the element common to both science and religion, the charisma of the founders of science and of the contemporary eminent scientists who, like lay-priests, celebrate the worldly mass that is scientific research (see also chapter 4).

It is true that for many science is a form of escapism from the tediousness of daily routine. For example, a Spanish organic chemist, on responding to the question whether she changed her mind about being a scientist after she began practicing as such, expressed (Scotland 2003) this view:

No lo se. Muchas veces me arrepiento de mi eleccion, pero a la vez no creo que pudiera trabajar en un banco o en una tienda haciendo lo mismo cada dia

[I don't know. Many a time I regretted my choice, but at the same time I don't think I could work in a bank doing the same things every day]

But it is also undeniable that the food scientist's indictment of the "enemies of science" also feeds upon the widely held opinion that science must not be tarnished by business and politics. To my question of what he thinks of politically engaged scientists and scientists' entrepreneurs, an Italian biotechnologist (Italy 2003) responded:

Ti rispondo nel modo più sincero e violento: ok per il "socialmente" impegnato, ma il "politicamente" e l'"imprenditore" proprio non li tollero! Vanno contro il principio del perché si sceglie di fare lo scienziato... Se c'è un impegno politico vuole dire avere preso comunque una posizione nel contesto economico-culturale, secondo me lo scienziato deve ragionare e operare in modo distinto dal business politico-economico e da come tira

il vento. Imprenditori: è una parola che mi fa venire i brividi. [...] Questo è un aspetto che quando pensavo di fare lo scienziato non avevo preso in considerazione.

[Let me be outspoken and fierce (sic!). I am fine with social commitments but I just can't stand the involvement with politics and business! It runs against the principles that lead someone to become a scientist... If there is a political commitment that means that one has already taken a stance in the political and economic context but in my opinion a scientist should think and act according to different standards from those of politics and business and should not be an opportunist. [...]. Entrepreneur is a word that makes me shudder. [...]. This is an aspect that I had not taken into consideration when I was planning to become a scientist]

Similarly, the president of the Association of Italian Biotechnologists, on the occasion of a conference held in Rome in 2001, inveighed against their disingenuous detractors:

Ma soprattutto voglio soffermarmi un momento su affermazioni di questi giorni che, confesso, considero un grave offesa a quanti svolgono con reale passione il proprio compito di ricercatore. Mi riferisco a tutti coloro che dipingono gli scienziati come una comunità connivente con gli interessi economici delle multinazionali.

Come possiamo dire questo di migliaia di ricercatori... che vivono in condizioni spesso precarie, che certo non hanno riconoscimenti adeguati dei sacrifici che certe scelte impongono, che quasi mai possono aspirare a prospettive di carriera?!

La condizione dei nostri ricercatori non può che dimostrare quanto sia il cuore a muovere le loro scelte, come questa professione sia innanzitutto dettata da una passione profonda e da un grande desiderio di conoscenza!

Non si può dire a tutte queste persone, animate da questi sentimenti, che sono solo dipendenti dagli interessi economici delle multinazionali! Va assolutamente smentito!

I nostri valori, le motivazioni che ci hanno spinto verso le biotecnologie sembrano diventare una colpa

[Above all, I would like to address certain recent allegations that I frankly regard as a serious offence to those who attend to their work as researchers with genuine passion. I am referring to those who portray scientists as a community conniving with the economic interests of the transnational corporations. We should not disparage thousands of researchers who often live precarious lives, who certainly lack recognition of the sacrifices involved in certain choices, who can seldom aspire to a brilliant career! The condition of our researchers proves how their choices are inspired by their heart, how this profession is fostered by a profound passion and by a great thirst for knowledge! You cannot say to these people, who are moved by such sentiments, that their decisions only depend on corporate interests. This must be rebuffed! It now seems that we must be blamed for our values and for the motivations that have led us to the biotechnologies].

The passion in these comments is almost tangible. It was during the interview that it became clear to me that the stern contraposition of arguments and iconographies dividing the advocates and the enemies of the biotechnologies, has dulled his ability to see that it is precisely the powerful injection of market economy, venture capitals, and corporate interests into American science, that has turned brilliant scientists pursuing knowledge into brilliant scientists pursuing money (and power). For all their conscientiousness, young researchers privately admit that they are perfectly aware that they will have to stoop to several compromises in order to do valuable research. I feel absolutely positive that the president of the Italian biotechnologists is not in bad faith but simply has nurtured an excessive confidence in the potentialities of science to establish what is true and viable and what is not, independently from external influences. Truth and science both emancipate - as they lead to self-determination - and serve the interests of the powers-that-be (Wright Mills 1970; Barber 1978; Horkheimer and Adorno 1984, 1991; Foucault 1975, 1981, 2001).

The ethical and intellectual profile of the young researchers I interviewed mostly reflects this idealtypization. Public-spirited, they enthusiastically advocate progressive and humanitarian causes, despise most politicians but not politics, fear irrational backlash against science but trust the capacity of the public to understand what is at stake when they are thoroughly informed. But how do we explain then the eagerness their predecessors displayed in backing up causes such as eugenics, racial hygiene, biochemical and nuclear warfare, etc.? First of all, there are scientists and scientists. Some are like a young Italian biotechnologist (2002) who, on pointing out that he is aware that some of his peers and colleagues are far removed from the real world but they believe they can save it, adds

Io ringrazio la mia famiglia... mi tengono coi piedi e con la testa soprattutto saldamente ancorati ai problemi quotidiani della vita di noi comuni esseri umani.

[I thank my family... for they keep my feet firm on the ground and especially my mind focussed on everyday reality]

There are also data showing that those with a non-idealized and non-exclusionist view of science will be more likely to meddle with politics (Gianos 1974), which goes against my contention that idealism can be extremely harmful to science. In fact, that of the effects of externalist and internalist factors upon science is certainly one of the most debated argument in the social studies of science.

The important essay by Hugh Slotten (1990) on the public outcry that took place in the United States over the use of poison gas during the Great War and the reaction of American chemists to such an outrage will serve as an introduction to the problem. It all started when the German Army first used chlorine gas at Ypres in Belgium on April 22, 1915. A few months later the Allies retaliated in kind and this sparked the huge controversy over the appropriateness of such a new, deadly weapon. A vast majority of Americans sided with those who proposed the immediate banning of gas warfare but most American chemists rebutted the charge of being agents of destruction by arguing that their commitment to the advancement of science was paired with an equally wholehearted commitment to the prestige and strength of their country. In so doing chemists joined the ranks of the quite large group of biologists and geneticists who had become socially engaged as eugenicists and had begun to exercise significant social influence and authority. Their advocacy successfully conveyed the message that, in fact, gas warfare was more humane than any other kind of warfare and, in the final analysis represented the attainment of a higher level of civilization¹³⁶ (Slotten 1990). That a notable proportion of the American public could share such a belief witnesses to the typically American infatuation with technological and scientific progress (American Progressivism), but also to the impressive measure of political purchase earned by scientists over the past decades and to the predisposition of so many scientists to a politically and ethically expedient brand of self-delusion. An American chemist, for instance, declared that research in asphyxiating gases *by no means lacked that fascination which characterizes all research, an intellectual journey into the unknown* and Charles L. Parsons likewise remarked that *War, the destroyer, has been...the incentive to marvellous chemical development with a speed of accomplishment incomprehensible in normal times* (both quotes are from Slotten 1990: 486). As a result, their particular understanding of the social function of science led them to the successful political lobbying of the American Chemical Association and the American Institute of Chemical Engineers against the ratification of the Geneva Protocol (1926). However, what is most disturbing is that they assumed a patronising and conceited attitude that is far from alien to the contemporary spokespeople for genetic engineering and biotechnology:

The secretary of the American Chemical Society argued that the Geneva Protocol was "born of hysteria" and "fostered by ignorance". Similarly, the society's president contended that "sentiment and not knowledge was the driving force behind the women's clubs and associations which attacked chemical warfare". The dread and fear of poison gas, another commentator asserted, was "based on an almost medieval attitude toward the black magic of science"

Slotten (1990: 492)

This connection of patriotism and progressive zeal is of course not confined to American scientists alone. Paul Forman, in a seminal essay on the interplay of ideology and physics in Weimar Germany (Forman 1973), argued that for many scientists serving the interest of science and the interest of their country is one and the same thing.

For several scientists, science had become a *Macht-Ersatz*, a surrogate of the military might and political influence their country lacked. Correspondingly, in the aftermath of the German defeat in World War I, on November 14, 1918 Max Planck declared before a session of the Prussian Academy of Science that:

If the enemy has taken from our fatherland all defence and power, if severe domestic crisis have broken in upon us and perhaps still more severe crises stand before us, there is one thing that no foreign or domestic enemy has yet taken from us: that is the position which German science occupies in the world. Moreover, it is the mission of our academy above all, as the most distinguished scientific agency of the state to maintain this position and, if need should arise, to defend it with every available means

¹³⁶ This was the opinion of none other than the secretary of the American Chemical Society

I feel the notions of scientific and technical *Gemeinschaftsarbeit* that is, labour in the service of the community rather than for a profit (Herf 1984), and *Leistungsgemeinschaft*, i.e. efficiency community, namely an achievement-oriented community primed for self-sacrifice (Finzsch & Wellenreuther 2001) go a long way to explain such an attitude. Both concepts derived from the ideals underpinning the Austrian, Swiss and German *gemeinnützige Gesellschaften*, the associations for the promotion of science for the common good (Lowood 1991). I suspect that they still linger in the international scientific community and I now regret that I did not sift the relevant evidence.

Nonetheless, my fieldwork data suggest that these days inferiority complexes and homesickness have replaced chauvinism and nationalism. I yet wonder if the former may well some day, in different circumstances, nurture the latter. An Italian biomedical researcher working in the United States disagreed with my suggestion that scientists, owing to their passion and to the prestige attached to science, could be more likely than others to fall prey to chauvinism. However, her rebuttal appears to me an indirect confirmation of my conjecture:

Non credo che gli scienziati in generale possano essere considerati più o meno patriottici di altre categorie. Per quanto riguarda gli scienziati europei, costretti per lo più ad emigrare per potersi formare e costruire le loro carriere, l'accentuato patriottismo è forse dettato più dal fatto di essere lontani dal loro Paese e di doversi confrontare quotidianamente con una società (nel mio caso quella americana) che non appartiene loro e che mostra le sue debolezze, contraddizioni e chiusure pur offrendo un ideale ambiente accademico e lavorativo. Il rapporto con la nostra patria è quello classico di amore ed odio: essa ci ha costretto a partire a causa dell'inadeguatezza della ricerca scientifica ma allo stesso tempo ci ha offerto un substrato di storia, di tradizione, di arte e di pensiero filosofico che questi americani ignoranti e belligeranti non arriveranno mai a capire

I do not believe scientists in general should be regarded as more patriotic than other categories. As regards European scientists, who are compelled to emigrate to get trained and build their own careers, their marked patriotism is possibly due to their being away from their country and to the necessity of dealing on a daily basis with a society (the United States in my case) where they don't belong and which shows its weaknesses, contradictions and narrow-mindedness yet offering an ideal academic and professional environment. Our relationship with our country is the classic love-and-hate: she forced us to leave because of the deficient standards of scientific research but at the same time she gave us a substratum of history, tradition, art, and philosophical thought that these ignorant and belligerent American will never understand

Be it as it may, this hard-won love for Italy, that becomes an embodiment of the ungrateful Mother that invariably lets her children down but is too beautiful and lovely to warrant their grudge, is fascinating. This becomes a painfully conflicting combination of feelings amidst the highly qualified émigrés. The constant longing for one's roots is frustrated by the awareness that it is only abroad that one can truly pursue one's professional aspirations. The one contribution that is most representative of these conflicting feelings is that of a geneticist now working for a prestigious university in New England. Here is one excerpt of her interview:

come vedi sono molto amara nei confronti dell'Italia. Ciò deriva dall'amore che ho per l'Italia, la mia terra, ed il desiderio di vivere con i miei amici e famigliari nel posto in cui sono nata e cresciuta. Sono arrabbiata perché l'Italia ha le potenzialità di essere un Paese moderno e giusto; invece fa finta di esserlo, nascondendo il marciume sotto la tovaglia. Per darti soltanto un esempio di ciò che mi fa infuriare; il corso di Laurea in Biotecnologie fu istituito alcuni anni fa, creando tanti laureati all'anno in un settore che non trova sviluppo in Italia, anzi sta andando in progressivo declino. Non è stato creato per motivi reali di richiesta di una certa figura professionale, come dovrebbe logicamente essere, ma soltanto per dare l'idea all'Europa ed al mondo, che l'Italia è un Paese all'avanguardia (e per altri motivi ancora meno nobili di cui non sono a conoscenza, ma posso immaginare...). Che bugia. Certo non posso generalizzare a tutto ciò che succede in Italia: ci sono alcuni centri di ricerca seri e produttivi, nonché rispettati a livello internazionale; e ci sono molte persone realmente impegnate nella scienza in Italia. Ma poiché questi esempi non costituiscono la normalità in Italia, a queste persone non viene riconosciuto il giusto merito e vengono invece progressivamente demotivate. Un po' mi sento anche "traditrice", per aver abbandonato il mio Paese ed essere andata a fare il mio mestiere dove è facile farlo, senza invece cercare di cambiare le cose. Ma sinceramente, non credo che ora in Italia sia possibile attirare l'attenzione su questo argomento. Ed io non ho l'esperienza (o il coraggio) necessaria per una rivoluzione.

[as you can see it is bitterness that I feel toward Italy. It comes from my love for Italy, my homeland, and my desire to live with my friends and my relatives where I was born and grew up. I am angry because Italy has the potential to be a modern and fair country; instead She but pretends to be such a country, sweeping the dirt under the carpet. To give you an example of what makes me furious: the undergraduate programme for the degree in biotechnologies was established a few years ago, churning out graduate students in a field of research that as of now is underdeveloped in Italy, if it's not progressively declining. It has not been instituted because that professional figure was much sought-after, as rational

decision-making would demand, but only to show Europe and the rest of the world that Italy is at the forefront (and for other, less noble, motives that I am not aware of but I can figure out...). What a lie. Sure, I should not push too far my generalization. In Italy there exist a few serious and prolific research centres that are also internationally respected; and there are some people who are truly committed to science in Italy. But because they are exceptions in Italy, their merits go unrecognised and they grow discouraged. To some extent it feels like I betrayed my country because I relinquished Her and have moved to place where it is easier to do my job, without even trying to change these things. But, frankly, I do not suppose these days it'd be easy to direct the attention to this problem in Italy. And I lack the experience (and the courage) that are needed for a revolution].

Canadian graduates and researchers instead display a bizarre form of "compulsive pride". They take great delight in the notion that Canada is one of the most successful socio-political experiments of advanced democracy, but they constantly need to reassure themselves that it is great to be Canadians in order to reinforce their problematic cultural identity. Comparatively high-minded Canadian scientists are then juxtaposed to the greedy ambitions of the American scientific establishment, mostly governed by the aims of powerful economic and political interests whose rapacious clutches are constantly threatening the stability and credibility of the Canadian arrangement. Social welfare and research freedom are also sometimes reported as a measure of the gap separating the admirable Canadian model and the flawed social system built up by their neighbours. I should also remind the readers that I did my fieldwork at a time when the relationship between Canada and the United States had been frayed by the refusal of Ottawa to endorse the American intervention in Iraq, a refusal that had been welcomed by most Canadians, who seemed not to tolerate the idea that George W. Bush Jr. could have such an influence on Canadian affairs.

As to internalist factors, the results of a more than three-year-long series of interviews conducted among scientists involved in the Apollo lunar mission by Ian I. Mitroff (Mitroff 1974) are quite enlightening. Those scientists not only reacted with irritation or sarcasm when queried about the idea of pure objectivity and emotional detachment in science calling it "simple-minded nonsense", but also maintained that it ought NOT to be viewed as a prescriptive ideal. Here are some of their comments as reported by Mitroff (ibid. 588-589):

- We must be emotionally committed to the things we do energetically. No one is able to do anything with liberal energy if there is no emotion connected with it
- You've got to make a clear distinction between not being objective and cheating. A good scientist will not be above changing his theory if he gets a preponderance of evidence that doesn't support it, but basically he's looking to defend it. Without [emotional] commitment one wouldn't have the energy, the drive to press forward sometimes against extremely difficult odds
- I still think you can be objective in spite of having strong interests and biases
- If you make neutral statements, nobody really listens to you. You have to stick your neck out. Those statements you make in public are actually stronger than you believe in. You have to get people to remember that you represent a point of view even if for you it's just a possibility
- Science is an intensely personal enterprise. [...] In every real scientific problem I've ever seen, the evidence by itself never settled anything because two scientists of different outlook could both take the same evidence, and reach entirely different conclusions. You eventually settle the differences, but not because of the evidence itself but because you develop a preference for one set of assumptions over the other. How you do this is not clear since there's not always a good set of reasons for adopting one rather than the other
- I've learned by now that you never completely prove or disprove anything; you just make it more or less probable with the best of what means you've got at the time

Other surveys seem to substantiate these claims (see Mahoney 1979).

It seems all the more likely that this could account for the ethical questionability of numerous statements made by population geneticists, bio-engineers, and psychiatrists, given that their pet ideas in the scientific realm are closely knit to social phenomena. In such a scenario, some measure of chauvinism would not be out of place.

It also stands to reason that their confidence may be strengthened by the passion that they throw into their work when they sense that their goals are attainable. Below are three examples of the physical effects produced by such expectations (Baker 1942):

1. *I have been working like a madman at Drosera...at the present moment I care more about Drosera than the origin of all the species in the world...I am frightened and astounded at my results* (Darwin to Sir J.D. Hooker)
2. *There are not many joys in human life equal to the joy of the sudden birth of a generalization...He who has once in his life experienced this joy of scientific creation will never forget it* (Prince Kropotkin)
3. *My heart began to beat violently, the blood rushed to my head, and I felt much more like fainting than I have done when in apprehension of immediate death. I had a headache the rest of the day, so great was the excitement produced by what will appear to most people a very inadequate cause* (Alfred Russel Wallace, naturalist, co-discoverer of the theory of evolution, on discovering a new species of butterflies)

Several of my informants confirmed that these are not exaggerations. Doing science may actually produce a state of mind akin to euphoria.

Willis H. Truitt (in Truitt et al. 1974) and C. H. Waddington (Midgley 1992) wonder if scientists' failure to apply the same passion to the pursuit of a humanistic brand of science could be an excuse to gloss over the necessity to think about broader issues. Be that as it may, it seemed obvious to me that there exists an ever-widening gap between humanities and natural sciences. I wholeheartedly subscribe to C. P. Snow's famous statement (in Truitt et al. 1974: 46):

Constantly I felt I was moving among two groups – comparable in intelligence, identical in race, not grossly different in social origin, earning about the same incomes, who had almost ceased to communicate at all.

Even though D. N. Michael (in Truitt 1974: 174) rightly argues that two types of scientists exist, a traditional sort that dodges every involvement in social issues, and another sort that is closer to the political entrepreneur rather than to the detached thinker, it remains that scientists, especially the young ones who make every effort to start a career, simply cannot devote time to anything other than science.

On the other hand, they demand a deeper knowledge of scientific research and its implications on the part of public opinion as *for the layperson scientific discoveries are not dissimilar from Greek myths* (Dupré in Longhi 1997: 137), a statement that curiously echoes Merton's worry that the general public could be *susceptible to new mysticism expressed in apparently scientific terms* (Merton 1973: 277), and Nelkin's remark that the awe-inspiring media-image of scientists creates *a distance between scientists and the public that, paradoxically, obscures the importance of science and its critical effect on our daily lives* (Nelkin, 1995: 15).

Yet, few are prepared to directly take part in the activity of divulgation, which stands in blatant contradiction with their commonly held opinion that scientists do have some sort of responsibility toward the broader social domain. Specifically the researchers employed by the ENEA, the Italian national centre of research, manifest a certain measure of contempt for the intellectual faculties of the *hoi polloi* (Longhi, 1997: 138). This agrees with Markus Gyorgy's (in Gavroglu et al. 1995) and Emily Martin's analysis (Aronowitz-Martinsons-Menser 1996) of the absence of an hermeneutics of natural sciences.

Some scientists have become separated from the rest of society and do not regularly pursue issues of a broad cultural significance and, when they do that, they clothe their thoughts with a technical jargon that results unintelligible to those who have no basic cognizance of the matters at issue or indulge on clichés that a critically-minded audience can only

find irritating¹³⁷. Consequently, Mulkay (1991) reports a survey among American college students¹³⁸ that reveals ambivalent views of science and scientists. Besides positive qualities such as intelligence, perseverance, abnegation, self-sufficiency, selflessness and relative indifference to money, the study reveals that scientists are also associated with social withdrawal and "cold intellectualism". Roslynn Haynes (1994) observes that surveys aimed at assessing how scientists are portrayed by the general public invariably yield *wholly negative estimate[s]* concluding that fear and alienation from science is the hallmark of Western society as it is testified by much Western narrative. See for instance Ulrich's perception of the scientific enterprise, in Musil's "The man without qualities":

But one thing, on the other hand, could safely be said about Ulrich: he loved mathematics because of the kind of people who could not endure it. He was in love with science not so much on scientific as on human grounds. He saw that in all the problems that come within its orbit, science thinks differently from the laity. If we translate "scientific outlook" into "view of life", "hypothesis" into "attempt", and "truth" into "action", then there would be no notable scientist or mathematician whose life's work, in courage and revolutionary impact, did not far outmatch the greatest deeds of history. The man has not yet been born who could say to his followers: "You may steal, kill, fornicate - our teaching is so strong that it will transform the cesspool of your sins into clear, sparkling mountain streams". But in science it happens every few years that something till then held to be in error suddenly revolutionizes the field, or that some dim and disdained idea becomes the ruler of a new realm of thought. Such events are not merely upheavals but lead us upward like a Jacob's ladder. The life of science is as strong and carefree and glorious as a fairy tale. And Ulrich felt: People simply don't realize it, they have no idea how much thinking can be done already; if they could be taught to think a new way, they would change their lives.

Robert Musil (1978)

The authors of textbooks and biographies of scientists sometimes display an analogous hagiographic attitude to men of science (Hermanowicz 1997). Thus, for some *the history of science is as inspiring in its human values as are the legends of the saints*, for others scientists are *more free from the influence of passion than those of other men* (Mahoney 1979: 350). Mahoney has brilliantly cut down to size the alleged superiority of a scientific mindset when compared to that of lay-people. On no account, whether we refer to objectivity and rationality, or to open-mindedness, intelligence, integrity, and communality, do scientists demonstrate themselves to be more gifted than any other class of people. These are some of the results of Mahoney's reappraisal (Mahoney 1973: 363):

- scientists are not immune to perceptual biases and is frequently quite emotional in response to technical and epistemological matters
- scientists may sometimes be unreceptive to relevant data and – particularly in the case of theorists – prone to hasty speculation and dogmatic tenacity
- reports of data fabrication and experimenter bias suggest that such phenomena are neither rare nor trivial
- scientists tend to be secretive and suspicious until they have established a public priority claim to their work; disputes over personal credit and priority frequently result in bitter arguments

It is useful to compare these findings with the classic Mertonian (Merton 1973: ch. 13) norms of scientific research:

- 1) Universalism: truth claims should be subjected to pre-established, impersonal justification criteria that exclude consideration of particularistic criteria such as scientists' race, nationality, or religion
- 2) Communism: the findings of science constitute a common heritage to be shared with the whole community with recognition and esteem the sole property right of scientists
- 3) Disinterestedness: scientists must subject their world to the rigorous scrutiny of fellow experts and they are ultimately accountable to their peers rather than to lay clientele
- 4) Organized scepticism: scientists should engage in the *detached scrutiny of beliefs in terms of empirical and logical criteria* that is free from infection by outside institutions such as religion

¹³⁷ viz. the report of CIBA's conference in Wolstenholme 1963 and the report of the "Engineering the human germline" symposium in Stock & Campbell 2000

¹³⁸ Beardslee and O'Dowd, 1962

These norms, together with the following attributes listed by Michael Mulkay (in Mulkay & Voijin 1980) make up the so-called "ideology of science":

1. Science can generate "objective" knowledge when scientists are granted some leeway in carrying out their work
2. No external ethical guidance is required in that science possesses an adequate internal value system
3. Much basic knowledge produced by scientists is destined in the long run to prove beneficial
4. This knowledge is socially and politically neutral
5. Scientists should not be held accountable for the misuse of this knowledge

Propositions 2, 4 and 5 are at the very least problematic (Barnes 1974; Jagtenber 1983; Mulkay 1991; Ancarani 1996). More, as remarked by Peter Weingart (Eliás et al., 1982), the very success of science has paved the way to its transformation from the outside. Its status of dependable source of knowledge has involved its massive engagement in social and political reform, this in turn triggering a process of elision of boundaries and identity blurring. Already Joseph Needham had shown that science, democratic and liberal though it may be, coexists with any type of political and economic regime as long as it is permitted to operate with a reasonable degree of autonomy (Busino, 1998: 21). On balance, it is hard to tell whether science has a greater influence on society than the obverse but, pace Popper, we have solid reasons to believe that it cannot establish what is morally acceptable and that one desire is preferable to another (Russell 1961 [1935]). To put it differently, science suggests what we can do, not what we ought to do (axiological neutrality). The contrary would imply embracing the naturalistic fallacy, that is, deriving an "ought" from an "is", a risk that biological determinists run time and again (Gyorgy Markus in Gavroglu et al., 1995), albeit science cannot possibly have moral authority. As to the ideological and ethical positioning of scientists, their political orientations, moral perspective and religious affiliations, it is self-evident that, given their varied background and geographical provenance it would be nonsensical to expect a great degree of uniformity. Nonetheless there are indications that the pigeonholing of scientists as politically progressive is more than substantiated by my limited sample. Never in my life did I encounter such a concentration of reform-minded subjects. But let me first outline the data formerly gathered by other colleagues and the hypotheses that they have been led to craft by their observations.

Clark A. Elliott (1982) explains that from the twentieth century onwards the pursuit of science became largely based on the attainment of the Ph.D., which implied that in order to become a scientist someone would have to spend a significant amount of time in a university. Universities are powerful agencies of social and political reform and it comes as no surprise that such knowledge is inevitably more politicised.

In 1968 in a survey on the characterisation of American scientists Robert Hirsch (1968) observed several facts that I should like to rehearse. In the first place, he held that figures showed that there was a rising number of Ph.D. students recruited from the lower social ranks and that there was a statistically appreciable orientation of young students from lower socio-economic settings to choose biology (with the notable exception of microbiology), chemistry (but not biochemistry), and engineering as opposed to the children of affluent parents who would rather go for humanities, business, law, and social sciences.¹³⁹

The most important finding for the sake of my inquiry was that *the biological sciences were overchosen by Negroes and underchosen by...those who were oriented to making money* (Hirsch 1968: 88). In fact biomedical sciences in Nazi times were deemed as decadent because of their association with Jewry and I have already explained that my informants were not expecting or

¹³⁹ As an aside, it appears that class-biases are apt to influence scientists' stance vis-à-vis the nature-nurture dispute. In 1968 Sherwood and Nataupsky (Duster 1990) pointed out that the emphasis upon the correlation of intelligence and genetic endowment was considerable among scientists from the upper-middle class, as opposed to scientists of more humble origins who would rather opt for environmental factors.

wishing to become affluent. The classical stereotypical portrait of scientists as liberal if not radical in political was confirmed by the actual data but Hirsch quoted (1968: 17) Richard L. Meier as saying¹⁴⁰

Chemists are seldom rebels or radicals. Their politics are usually a non-violent conservatism or liberalism...which is compatible with service both in corporations and in government agencies. [Physicists on the other hand are]...by nature politically radical. Their mind is schooled in the proposition that progress is made by discarding various assumptions and premises, thereby making it possible to create a more powerful theory upon a simpler underpinning. This tends to lead them into a vague leftist philosophy – partly as the only rational set of value premises offered in the world of ideas between 1936 and 1940

Notably, although their self-perception is on the average that of fairly progressive persons, most of them would stigmatise if not despise those scientists entering the political arena and promoting their political agenda. This is something I experienced myself during my interviews. Probably the only Italian biologist who had chosen to run for the European Parliament was either admired as a brave man or detested as someone who had privileged politics over scientific research and as such had betrayed the category and its principles. The blunt description made by one of the interviewees was *a moron who talks bullshit*. He accused him of having discontinued important research since the 70s and implicitly questioned his right to call himself a scientist. Another respondent likewise argued:

Credo que los científicos no deben estar involucrados en política para nada. La ciencia no es un negocio

Some instead believe that (Scotland-based Italian biochemist, switching from Italian to English):

A real scientist deve avere political and communicative skills. Non a caso I più famosi scientists contemporanei e passati (sic!)¹⁴¹ sono e sono stati highly committed con la politica e con i politici

[A real scientist must have political and communicative skills. It is no accident that the most famous contemporary and past scientists are and have been highly committed to politics and with the politicians]

Are we mistaken in thinking that perhaps a further factor is at play? In his review of Medawar's celebrated "Advice to a young scientist", Max Perutz asks the readers (Perutz 1989: 193)

What else draws people into science? It seems to me that, just as the Church did in former times, science offers a safe niche where you can spend a quiet life classifying spiders, away from what E.M. Forster called the world of telegrams and anger. To the ambitious poor, science offers a way to fame or reasonable wealth that needs no starting capital other than good brains and prodigious energy

This would imply that many scientists wish they could have the best of both worlds: conducting their politically and socially relevant inquiries without being consulted about the wider applications of their discoveries. This is indeed the impression I draw from my fieldwork data. Nevertheless, this also presupposes that it is actually possible to establish clear-cut lines dividing what is scientifically responsible and what is ideologically inspired, what pertains to scientists' preserves and what strains their prerogative. Interestingly, neither Bacon nor Descartes, namely the founders of modern scientific method, ever felt it was opportune to draw a code of conduct for responsible scientists. They did not even concern themselves with such issues as the value of human existence, the morality of the inquiry into the nature of mankind, the social responsibility of scientists, and the ideological biases affecting a scientific career. That was just beyond their scope (Haberer in Cerruti & Fazio 1976).

In the course of time things changed. According to Daniels (1967: 1699) in 1870's United States *for the first time, great numbers of scientific spokesmen began to vocally resent this dependence upon values extraneous to science* [utilitarian, equalitarian, religious]. *The decade, in a word, witnessed the development, as a generally shared ideology, of the notion of science for science's sake.* This struggle was still developing in the wake of the Enlightenment's emancipatory wars against the religious and monarchic yoke and led up precisely to the progressive dogma which employed values and rules more consonant to those of the scientific domain but failed to concede that those criteria could not possibly be of a universal, everlasting, and pre-established sort.

¹⁴⁰ "The Origin of the Scientific Species", Bulletin of the Atomic Scientists, 8 (June 1951), 169-73.

¹⁴¹ The correct Italian expression would be *del passato* (lit. "of the past"). *Passati* (adj. "past") is a literal translation from English.

Eventually, the devastation of WWII and the Vietnam War forced scientists to acknowledge the existence of specific responsibilities. In 1939 it was J.D. Bernal who called upon scientists of the anti-fascist coalition to work toward the attainment of a democratic world, the best guarantee for free scientific inquiry. He contended that

Science will come to be recognized as the chief factor in fundamental social change...science should provide a continuous series of unpredictable radical changes in the techniques (of the economic and social system)...Whether these changes fit or fail to fit in with human and social needs is the measure of how far science has been adjusted in its social function

Bernal quoted in Brownhill & Merricks (2002)

Ironically, only a few years later on June 12th 1945, the Franck Report was submitted to the American secretary of war, Henry Stimson, by a group of extremely concerned atomic scientists at Chicago University. It read as follows:

[We] do not presume to speak authoritatively on problems of national and international policy. However, we found ourselves, by the force of events during the last five years, in the position of a small group of citizens cognizant of a grave danger for the safety of this country as well as for the future of all other nations...We therefore feel it our duty to urge that the political problems, arising from the mastering of nuclear power, be recognized in all their gravity...We believe that our acquaintance with the scientific elements of the situation and prolonged preoccupation with its world-wide political implications, imposes on us the obligations to offer in the committee some suggestions as to the possible solution of these grave problems

After the atomic bombing of Japan the immense might they had unleashed and entrusted to politicians frightened some of them (Moore 1996). Biochemist Eugene Rabinowitch expressed similar concerns (in Winkler 1993: 321)

In the summer of 1945 some of us walked the streets of Chicago vividly imagining the sky suddenly lit by giant fireball, the steel skeletons of skyscrapers bending into grotesque shapes as their masonry raining into the streets below, until a great cloud of dust rose and settled over the crumbling city

The political engagement of scientists in the form of the advocacy of a more humane science is thus inseparable from the acknowledgement on their part that a line had been crossed, that functioned as an historical watershed. Before scientists could still believe that their endeavours would eventually produce more advantages than harm.

This was clearly a radical turnabout from the compliance of American and British chemists involved in WWI programme of chemical warfare. A further source of unease for scientists turned out to be the Vietnam war. Widely deemed as an imperialist and unjust war, it spread in several universities a climate of hostility towards scientists who somehow contributed to the American war effort. The claim that the American military build-up was necessary to maintain the prosperity of the country was demystified and exposed for what it was, a fairy tale. The psychological pressure brought many scientists to face up to their unwitting complicity and for some even teaching became a source of ethical dilemmas:

By the late '60s I wanted what I did in my science to be related more to my personal values, and to doing good for human beings in a very direct manner. One of the elements of crisis was that while I was successful as a researcher at Vanderbilt and had long ago decided that I would not do military work, I was teaching graduate students who would eventually do military work, while at night and on the weekend, I was protesting the [Vietnam] War. And that caused a great deal of stress for me

David Kotelchuck (Moore 1996: 1604)

Science as a reified entity does not exist, let alone pure science. Blaming science for the existence of weapons of mass destruction is a misconception. We should fault individual scientists, not the entire category (Dubos 1961). Precisely because scientists are not exempt from prejudices and fraudulence it is imperative that they be invited to partake of the public confrontation of opinions, data, and agendas. This is an opinion previously held by none other than Albert Einstein. One day he wrote to his friend, German physicist Max von Laue – who under the Nazi dictatorship tended to cling to the principle of neutrality – that everyone could see where that silence and self-restraint would lead Germany. He rather believed that people like Giordano Bruno, Spinoza, Voltaire, and Humboldt had set an extraordinary example for scientists (Hermann 1982).

6.2 SCIENTISTS AS MORAL AGENTS?

We believe it to be a responsibility of scientists in all countries to contribute to the education of the peoples by spreading among them a wide understanding of the dangers and potentialities offered by the unprecedented growth of science. We appeal to our colleagues everywhere to contribute to this effort, both through Enlightenment of adult populations, and through education of the coming generations

Declaration of Wien, 1958

To my mind the history of the eugenics movement in the United States should be essential reading for geneticists

Jon Beckwith (2002: 112)

Mengele gained his notoriety for his experiments in genetics. I was trained as a geneticist, yet never in all years of my education or during my entire career as a scientist did I encounter his name except in the popular press. In the field of science, Mengele does not exist.

David Suzuki (1989: 24)

Nearly all of my interviewees work in laboratories, a term that comes from the Benedictine motto *ora et labora*¹⁴², but no one has ever reduced his or her existence to laboratory life, abstract thought, and extraneousness to moral conflicts. Political disengagement is nowhere to be found among them. Few of them are moderate and their political convictions were already deeply embedded before they made the decision to become scientists. Their being scientists merely preserved their radical inclination as well as their curiosity. This is in keeping with my preliminary assumptions but as my inquiry proceeded I have come to realise that political radicalism and social engagement are not necessarily linked. A disposition to apply one's skills to the betterment of society has persisted – the same inducing most scientists to accept being involved in international committees or study panels (Nossal 1975) –, but what they lack is the grand vision – the *flirtatious concern for, and cloying stewardship of, succeeding generations* (Gudding 1996) – driving past eugenicists to assume that scientific data serve a prescriptive function in the social and ethical sphere, namely that “rationally managed society” and “scientifically managed society” come to the same thing¹⁴³.

My results tie in with Janovy's remark (1985) that the students of bio-sciences who display an actual command of the ethical discourse are very few. In accordance with Nader's analysis, few of my respondents doubted the conventional view of science as clearly separated from its applications. Pace Luria (1984), science is still regarded by many as a sacred priesthood absolving its practitioners from any social responsibility. I also have strong suspicions that some of them presume that the principles of compassion, liberality and tolerance they more or less consistently espouse, will some day be shared by a majority of human beings. The impression I have drawn is that of a relatively optimistic outlook. Even the customary distrust of politics targets more the academic institutions, guilty of stooping to compromises that threaten research freedom, rather than the political arena at large. Most respondents, especially in Canada, seem to be rather content with the kind of society they live in, although they certainly do not fail to deprecate pauperism, industrial pollution, racism, and so forth.

While they do believe, as Weingart suspects (Aant et al. 1990), that there is no link between what they are doing now and the errors of their predecessors, most do not even know the meaning of the term eugenics. They have never been taught that there existed such a thing as an international movement joined among others by hundreds of biomedical professionals that sought to propagate the belief that what is theoretically correct from a scientific viewpoint – and it need not even be thoroughly verified – is morally sound as well. They never heard of their campaigning for the mass-sterilization of deviants and of the public endorsement by several of them of Hitler's eugenic policies (Kühl 1994; 1997). Ironically, those who have some cognisance of the term believe that a considerable number of people are afraid that their work is

¹⁴² pray and work

¹⁴³ Viz. Jürgen Habermas critique of scientism (Habermas 1968; 1985; 2001)

ushering in a new eugenics and wish a better education could stave off such groundless fears. But there is the rub. Thus far the only people I met who were seriously concerned about eugenics were uncommonly erudite. By contrast, most of the time I am asked to give a brief explanation of what I mean by eugenics. A further irony consists in the fact that the role that education should play in the dissemination of eugenic teachings was cardinal in both Nazi Germany (Faith Weiss in Nathal-Olff 1993) and the utopian society described by Alexis Carrel. In fact it was widely recognized that through imposition alone the desired goals could not be achieved. Still in the Eighties, former Nazi doctor Dr. Johann S. (Lifton 1986: 133) was persuaded that

National Socialism failed because we could not develop enough biology teaching – it was not possible to educate people sufficiently in biology...the tragedy of National Socialism was that it was never realized.

Interestingly, independently from what people know about eugenics, the data I have collected show that what lay-people think of them, when they explain what the nature of their job is, differs appreciably from country to country. In Italy by and large being a scientist is not perceived as essentially cool: some are lawyers, some are plumbers, and some others are scientists. Conversely, in Canada and Scotland, there seem to exist a keener interest in what scientists think and do. In Canada, one student of biomedicine instead reported that

Almost all the time, I get a, "Wow...that's cool..." or "...you must be very smart". I don't know whether they really mean it or they are just being nice. But my impression is that lay-people generally think that scientists are smart and gifted people, they typical "book-worms" if you will. Some consider that the scientific mind can only be given and not obtained (i.e. nature vs. nurture).

And then added:

I generally feel that people are always interested in medical advancements and ideas because it may potentially pertain to their health as well. [...]. Nonetheless, I feel that lay-people think that scientists are a different breed of people!

The commentary of one of the students of genetic counselling on what people understand by eugenics was: *they do not know the meaning of the word but they do know what it used to be.* Nevertheless, she also remarked that students are open-minded and more receptive. When she talks with them she feels there are fewer ideological barriers, and cloning and tinkering with God's creation cease to be rhetorical weapons. My impression is that in Canada young researchers feel that public opinion is mainly on their side, as opposed to Italy where biotechnologists feel threatened by traditional creeds and new forms of fanaticism. Apart from the discrepancies between the way genetic counselling is being done in Italy and Canada, scientists self-perception and what they believe is the public perception of their work is the only domain in which I could detect a significant disagreement between Italian and Canadian researchers. Italian scientists lament that too many are indifferent to the fate of science in Italy. They blame successive governments for not paying attention to the brain-drain phenomenon. Few are aware that the scarcity of venture capitals in this field in Italy does not simply accrue from political ineptitude but also on structural causes deeply embedded in Italian history and culture. All in all, they feel neglected by the public as well as by politicians and entrepreneurs. It is a case of indifference breeding low self-esteem.

By contrast, in Canada biotechnologies are being generously bankrolled by Ottawa and by some provincial governments. The proximity of the United States has probably made more palatable the idea that science should be closely tied to big business and anybody can appreciate the scale of the changes that some Canadian universities are undergoing in order to meet the expectation of potential investors. Unlike their Italian colleagues, Canadian bio-scientists positively feel they are important social actors. Economic and political saliency cause public opinion to pay a greater attention to science and induce scientists to feel under scrutiny but seldom under fire.

Therefore the problem raised by Sarah Cunningham-Burley and Mary Boulton (in Albrecht et al. 2000), that the presence of scientists in those panels discussing the social and ethical impact of genetic research may somehow defraud public opinion of its chance to have a say on those same issues, because of the feeling of ill-preparedness to challenge

scientists' self-assurance, is simply unfamiliar in Italy. My feeling is that it is only abroad that the monopoly of expertise could suppress critical discussion (ibidem).

Be it as it may, the two aforementioned scholars seek to stress the "lay expertise" of the general public and urge scientists to become conscious of the sophistication of this knowledge which appears to be sufficiently ample and diversified, although obviously not flawless, for the needs of non-professionals. Public opinion is to a large extent ready to get involved in a general debate. Moreover, scientists must feel that analysts of the social implication of scientific research are no mere detractors but also potential allies. Instead of laying against scientists and technicians the charge of enabling the powers-that-be to perpetuate a stale and iniquitous system we ought to ask ourselves why the criterion of cost-benefits is determining the shift of funding to scientific research from a public to a private sphere. It seems self-evident to me that it is precisely in the interest of big business to widen the gap between the two cultures, by victimizing their critics and ladling out praises and moneys in return for sycophancy. The one thing we can take for granted is that the influence of big business, besides being a fundamental means of promotion of democracy and science can be a mortal enemy of both.

Vittorio Ancarani (1996) has pointed out that an idealistic, anti-utilitarian undertone running through the German academe by the time of its foundation conflated the notion of *Wissenschaft* (science) and *Bildung* (intellectual development) and a massive predilection for practical application was not ubiquitous. It was in the United States that this development took place and, to use a Baconian distinction, the *experimenta lucifera* gave way to the *experimenta fructifera*.

Although not a new one, as already at the turn of the 19th century there were scientists working in university laboratories for giant chemical concerns such as Bayer and Hoechst (Cosmacini 1989), this is a phenomenon on the increase. Big business promotes big science and big science in turn demands an ever growing amount of capital to conduct its investigations in a seemingly unending spiral. This bond between inquiry and business can't but open the door to biases and malpractice and to a widening gap between theory, social purposes and social impact of science. On the contrary, instead of appreciating the diversity and broad scope of social needs and purposes – what is generally designated as "social responsibility of science" or "science in the public interest" –, many appear to be gradually siding with the corporations. Yet, some contrast this trend (Lakoff in Spiegel-Rösing, de Solla Price 1977).

Take Nancy Olivieri's and David Healy's cases. Their scandals of the first magnitude are two of the most glaring examples of a violation of the academic freedom and the right of patients to informed consent during the past decade, but their conduct has been admirable. This has occurred in the form of harassment, intimidation and calumny on the part of those who seek to prop the cause of profit-oriented managers of pharmaceutical industry within the academic milieu. Dr. Nancy Olivieri, a medical researcher at the Hospital for Sick Children, as well as an associate of the University of Toronto, has been warned of legal actions by the Apotex Inc., the corporation for which she was conducting a series of clinical drug trials on the efficacy and safety of deferiprone, a drug employed to combat thalassimia whose patent was held by Apotex itself, had she disclosed to the public the confidential information about unexpected risks she had detected in its usage. If it hadn't been for an inquiry that has destroyed all suspicion of malfeasance by Olivieri, the hospital would have ceded to the corporation's demands that she be removed. Dr. David Healy, a British psycho-pharmacist was urged in 2000 to join the department of University of Toronto-affiliated Centre for Addiction and Mental Health but this job offer was suddenly revoked after a series of speeches he delivered in which he pointed up the abnormally high incidence of suicidal attempts among patients under treatment with Prozac. What happened was that the executives of Eli Lilly Pharmaceutical Company, which reaps huge profits from the Prozac sales and which financed the above mentioned research centre got significantly annoyed by this attitude and pressed the university board to change their verdict rescinding his contract. The trouble here lies in the all too common lack of concern by university rectorates and hospital management for the problems raised by the current regulation in the matter of public disclosure of the outcomes of scientific trials run on account of private business. It so happens that confidentiality clauses clash with the duty of a researcher to inform those who will be affected by the tests –

the classic conflict between the imperatives of truth and profit – but the dire need for private funds that characterises modern science tilts the balance in favour of private companies. In consequence of this careless conduct universities do not seem to be in a position to work as intermediaries among general public, politics, and industry. This I think is also the conclusion reached by Olivieri and some of her University of Toronto's colleagues, who have subsequently set up an independent organisation, i.e. Doctors for Research Integrity (DRI), aimed at securing the independence and integrity of scientific research against external threatening pressures. In fact the relationship between funding sources and scientific research might become a source of heated dispute over ethical dilemmas. The pressure placed by patients on both scientists operating in the field of pharmacology and the suppliers of legal drugs makes for one of the biggest businesses of all. More, this same pressure is directed at the discovery of immediately applicable techniques and saleable products (Wofsy 1986). Knowledge for the sake of knowledge, namely the initial conception of science, plays no part within this framework. Then one must add the spectacular increase in expenditures, the progressive curtailing of public funding to universities and laboratories, and the ceaseless flow of donations by pharmaceutical industries to university students, a behaviour that seriously disrupts all attempts to build up a deontologically oriented conscience amidst young scientists. The bond between researchers and private enterprise that is being so prematurely established is no doubt likely to endure, not least because of the current prevalence of short-term contracts and grant-dependence. As a consequence, Barbara Culliton, news editor of "Science", in 1981 commented on the rising concern that the *new ties between the academy and industry will strain the fabric of the university, and that the public perception of science will be altered* (quoted by Wofsy 1986: 479). A major threat lies in this state of affairs, which is usually termed "client science", turning the biotechnologist into a salesman, more involved in the business and less prepared to stand up and denounce possible malpractices. Consequences may be truly startling:

In other prominent professions of our age we see similar circumstances in which people no longer see themselves as self-conscious moral agents and citizens of a free society, but rather as subjects of large corporate bodies that, while extending organizational control, gradually eliminate the individual's need to think

Langdon Winner in Durbin (1990: 56)

Entomologist and ethologist Giorgio Celli refused to sign a contract that obliged him to not make public the results of a research he would conduct for an important chemical concern:

Non firmai, perché ritenni, e sono ancora oggi della stessa opinione, che le scoperte della scienza, minime o massime che siano, soprattutto se conseguite in un ambito pubblico come l'Università, siano patrimonio di tutti. Per evitare che se un ricercatore scopre, per esempio, che una certa molecola immessa nell'ambiente è cancerogena, non gli sia impedito di farlo sapere in giro, perché chi paga ha posto il veto.

[I did not sign because I reckoned, and my opinion has not since changed, that scientific discoveries, however important, particularly when achieved in a public sphere such as the university, belong to all. I wanted to avoid that if a researcher finds out, for instance, that a given molecule released outside of the laboratory is carcinogenic, he or she could be prevented from making it public because the sponsor has put a veto on divulgation].

La Stampa - 3 June 2001 by Giorgio Celli

For the most part the social studies of science are dominated by a curious neglect of the figure of the socially responsible scientist, because many still regard it as an oxymoron. But let me reiterate that the question at issue is not science advocacy but the dissociation of scientists from the effects they bring about on the populace at large. The development of biological weapons, the spreading of human-made viruses, the pollution of the environment, the potential threat of genetically modified living beings to the bio-sphere, and the social and ethical consequences of the manipulation of human DNA are not issues that scientists must be permitted to wash their hands of. The science that in the name of value-neutrality feels no concern for the consequences of its deeds is nothing but irresponsible scientism (Alheit in Sandkühler & Holz 1987). Scientists have instead a moral obligation to partake of the ongoing debates on controversial issues (Broberg, Roll-Hansen, 1996) for science is nowadays no longer in danger of being silenced or squelched by the State.

Science is an indispensable component of the process of decision-making and none would doubt that this is a phenomenon destined to aggrandize. In such a situation moral neutrality – for instance on matters related to the belief in biological determinism, one whose validity is being questioned by nearly all serious experts in the field of biology, but with insufficient vehemence – is tantamount to complicity in public deliberations endangering the institution of welfare state or individual liberty. In Dante's Divine Comedy the uncommitted in times of crisis (*ignavi*, the lukewarm) were deemed not good enough for Heaven and not bad enough for Hell. These souls, who are faulted for not even being able to sin and therefore do not deserve the slightest compassion, dwell in the Ante-Inferno, a marginal place inside the gate of Hell but before the river Acheron, and are administered the worst torment, that is, they must ceaselessly and vainly chase a blank banner, stung by hornets and with worms lapping their blood. This is after all what is meant by the "enlightening role of science" (Broberg, Roll-Hansen, 1996), that scientists have the duty and the responsibility to serve society (*Gemeinschaftsarbeit*) rather than the State or a private business (Resnik 1998)

It follows that scientists could not only be agents of emancipation but also have a moral obligation to apply their skills to the critique of all social and scientific axioms as well as refrain from indulging in unfounded dogmas. They can be subversive intellectuals in the way put forward by Jeffrey Goldfarb (in Delanty 2001) that is, promoters of the subversion of the common sense. Their essential quality, critical thought, stems from the amplification of what is perhaps the hallmark of human beings, our naturally inquisitive character. Here is one interviewee's description of what it is like to be a scientist:

Ho capito che fare lo scienziato non è solo leggere libri ed imparare cose già scritte. Uno scienziato è uno che pensa, si pone il perché di cose di cui nessuno si era posto il perché e, partendo da ciò che già si conosce di quell'argomento, comincia ad immaginare quello che avviene ad un livello un poco più approfondito. [...]. Uno scienziato è in pratica una persona estremamente curiosa di ciò che lo circonda

[I understood that being a scientist involves more than reading books and learning things that had been written down already. A scientist is someone who thinks, someone who asks himself why something unknown is the way it is and, starting from what is already known about the subject, begins to guess what goes on at a deeper level. A scientist is substantially a person who is extremely curious about what surrounds him]

Another one recalled that during his childhood:

I can see that I had an inquisitive mind. After watching educational science programming on television (i.e. Bill Nye, Beakmen's World, etc.), I would try to "redo" the experiments. Partly because I wanted to observe such phenomenon myself. [...]. Basically, I chose to become a biomedical scientist because I have a strong interest in science, I know that jobs are almost guaranteed with a science degree, and I think being a scientist is kind of honourable

This is precisely the ideal-type of scientist that most scientists claim to model themselves after ever since Galileo Galilei's time. The associated ethos has at its core pluralism and collaboration, creativity, open-mindedness, curiosity, all qualities that make an outstanding scientist. Historically, science may well have legitimised racism but it also disputed racist claims through the accumulation of compelling countervailing evidence (Barkan 1992). Scientists have the right and the duty to see that citizenry (and politicians) be aware of what is at stake. One of the Italian émigrés I interviewed seemed to have embraced this ethos and predictably admires the ethical stance of Jon Beckwith. These are her reflections on the issue:

Oggi lo scienziato deve anche essere in grado di rendere pubblico e comprensibile il suo lavoro, per evitare di diventare un "tiranno" e togliere al resto delle persone la possibilità di scegliere e decidere per la propria vita. [...]. Lo scienziato stesso è anche responsabile dell'impatto delle innovazioni tecniche sull'opinione pubblica, e di far comprendere in modo chiaro il significato e le prevedibili (ed imprevedibili) conseguenze del proprio lavoro.

[These days, scientists must be able to popularize their work so as to avoid to become a "tyrant" and prevent people from being able to decide on their own about their own life. [...]. Scientists themselves are also responsible for the impact of technological innovations upon public opinion, and to help clarify the meaning and foreseeable (or unpredictable) consequences of their work]

CONCLUSIONS

This inquiry was conceived as an investigation into what it means to be a life-scientist in the course of the current biotechnological revolution (Graham 1981). I intended to interview young life-scientists about their social responsibility, if they felt they had any, as well as the principles informing their behaviour. What inspired me is the growing awareness that today life-scientists are widely regarded as authoritative and influential, and their presence in the media and in the political and business arena is no longer exceptional (Nelkin 1995a; 1995b; Webster 1994; Weingart 1999). Having developed a principled conscience (Easlea 1973), some are now promoting advocacy initiatives in science, policy-making and society at large (Salomon 1970; Ezrahi in Thakray and Mendelsohn, 1974; Mulkay 1980; Habermas 1985; Ancarani 1996). When I set about to conduct my fieldwork, I believed that science in the Twentieth century should be viewed as an enterprise struggling to preserve its functional autonomy (Mulkay 1980; Andresen et al. 2000), while in the process of being incorporated by market and politics (Lyotard 1979; Schwartz in Nader 1996) and thrust into the so-called *stahlbarte Gehäuse*, i.e. the iron cages of bureaucratic rationality (Weber 2000). My fieldwork data show that this is indeed the most pressing concern of the young life-scientists, who are becoming painfully aware that in a market-driven world pure science is not an option.

I went into the field possessed by the romantic vision of young scientists striving to make a name for themselves by means of some epoch-making discoveries. My grant proposal claimed: *the young life scientists I am meeting blend traits of Brecht's Galilei (Brecht 1963) and Musil's Ulrich (Musil 1978): anti-heroes confronting extraordinary circumstances*. I was soon to realize, however, that in the sphere of science there is more self-delusion than actual prospects and that many of them are utterly dissatisfied with the treadmill practice of laboratory science. They do love what they are doing and they still hope some day their contribution will make a difference, but I suspect a good few are bound to lose their enthusiasm, crushed by the exploitative methods of their supervisors and by the highly competitive standards of contemporary life-sciences, due to both an overflow of graduates and to increasingly demanding funding agencies.

I had postulated that a new generation of scientists was emerging that regarded notions such as humanity, freedom, civic engagement, and social responsibility highly as part of their professional ethos (Easlea 1973; Brubaker 1984; Luján, Martínez, Moreno, 1996; Sintomer 1999), that is that attitude to modernity that Kant and Foucault identified as the hallmark of Enlightenment (Kant 1784 in Albrecht & Hinske 1981; Foucault 1978 in Rabinow 1991). However, I have now reached the conclusion that this youthful idealism is tempered by the growing feeling that groundbreaking research is not being done in their institute; that the huge sacrifices they are asked to make seldom allow them to cultivate other interests and are only occasionally truly gratifying; that the public opinion is simply too ignorant to wholly embrace the scope of their endeavours.

Given their influence in modern society, I initially believed that a good measure of humanity, civic engagement, political consciousness, and social responsibility are an indispensable component of their professional ethos. However, the tragic outcome of past social and political commitments on the part of biomedical professionals cautions us against overrating public spirit in the life-sciences. We know for instance that Karl Brandt, a doctor and the head of Nazi euthanasia project, cited both Schweitzer and Hitler as two examples of praiseworthy life-conduct (Lifton 1986).

Contrary to my expectations, this research has proven to me that the figure of the civically-minded bio-scientist is highly problematic. This conclusion is also validated by Alfonso J. Damico (Damico 1982), who has correlated the model of cognitive development and moral maturity unveiled by Kohlberg (Kohlberg 1981; Puka 1982) with the propensity of

individuals to acquiesce to authority and peer-pressure (Stanley Milgram¹⁴⁴ and S. E. Asch 1952). He has levelled a perceptive critique at Kohlberg's contention that there exist universal laws regulating moral development. Drawing on the analyses of a number of social and cognitive psychologists, Damico rather contends that the situational context, i.e. the social network of interactions, roles, expectations, obligations, etc., exerts a powerful influence upon moral choices and maturation that goes beyond a simple coupling of cognitive and moral development. This can be ascribed to the fact that a society's morality reflects its power structure. He then goes on to assert, and this is a crucial theme of my dissertation, that just men do not necessarily build just societies. In other words, civically-minded individuals with advanced cognitive skills are not more likely to cultivate self-determination and morality in a paternalistic and highly ideologized milieu (e.g. corporativism, chauvinism, millenarianism, utopianism, and so forth). In those instances, their moral competence is as hindered as that of lay-people but their skills may become mortally dangerous.

We should finally concede that politically responsible science is a vast ethical quagmire (Ricciardi-Platen 1993; Micklos & Carlson 2000; Deichmann 2000). Science has displayed the greatest measure of public spirit precisely during the eugenic era, especially in the Third Reich and progressive America. In this sense, the questions posed by Michael Freedman in "Eugenics and Ideology" (1983) are exceedingly topical:

1. Why did a considerable number of well known and lesser-known social reformers find some of what the eugenicists had to say interesting and important?
2. Why did many eugenicists feel a need to associate, verbally and practically, with some salient arguments of social reformers?
3. What could liberal and socialist social reformers see in eugenics?

The answers lie in the present. Nowadays we witness the medical and ethical rehabilitation of eugenics, which is now scientific, ethical (in that it respects individual choices), as well as cost-effective (Benichou 2002). The anthropological pessimism of the past, that had given rise to negative eugenics, has now been replaced by a combination of anthropological and historical optimism (Roucloux 2002). This optimism is in turn paving the way to the re-working of ethics on scientific foundations, namely the chief goal of eugenics (Simonnot 2001).

Juliette Chung (2002) suggests caution when it comes to making value judgements on eugenics. She argues that some of the questions raised by eugenicists were not wrong-headed. Pauly (1993) has ventured to suggest that we should return to the original broad meaning of the term "eugenics", that is, the biological improvement of human beings, which would encompass all relevant disciplines and remove conceptual inhibitions.

My feeling is that these scholars may be right. Our inclination to place a taboo on all aspects of national socialism and eugenics is self-defeating. The evidence shows that National-socialism and eugenics, like the Inquisition before, have

¹⁴⁴ An impressive instance of the influence of science upon lay-people's behaviour has been provided by Milgram's experiments that were meant to quantify the level and frequency of submission of a representative sample of population to the authority of a professional and to the noble goal of furthering scientific inquiry (Milgram 1974). They presupposed the presence of a professor, a tested subject and a collaborator who was to answer correctly to the questions put by the study participant lest he receive a discharge up to a maximum of 450 volts. It goes without saying that the real experiment did not consist in testing the efficacy of compulsory teaching but rather the leverage of power. It revealed that (Milgram 1974a): *2/3 of this study participants fall into the category of obedient subjects, and they represent ordinary people drawn from the working, managerial, and professional classes. 65% of all of the teachers punished the learners to the maximum 450 volts. No subject stopped before reaching 300 volts. 60% of Yale undergraduates were fully obedient.* The same experiments were repeated in Australia, Germany, Holland, Italy, South Africa, Spain, Jordan, with analogous results (Meeus, Raaijmakers, 1986). Morality did not matter face to face with bureaucratic and scientific authority and only when a case of conflicting authority was introduced, was action liable to become paralysed. One of the guinea pigs, Mr. Braverman, was told the real nature and purpose of the experiment and, interviewed one year later, he affirmed (Milgram, *ibidem*): *what appalled me was that I could possess the capacity for obedience and compliance to a central idea, i.e., the adherence to this value was at the expense of violation of another value, i.e., don't hurt someone who is helpless... as my wife said, 'you can call yourself Eichmann', I hope I deal more effectively with any future conflicts of values I encounter.* The conclusion we should draw from Milgram's experiment is not only that scientists, just like any other human beings, are ready to succumb to authority (Cole 1983), but also that, in this day and age, scientists themselves embody authority.

been modern and, in a paradoxical and alarming way, progressive answers to ancient questions and problems. It is only in retrospect that we can describe how tragically mistaken their champions were. But those questions – the quest for happiness, health, harmony, well-being, order, longevity, existential meaning, etc. – still haunt us, and the related ideals, fears, aspirations, prejudices, obsessions, and hubris brought about by the eugenic era are likewise forcefully present. Eugenics is here to stay because it is embedded in both the Enlightenment project and the Romantic sensibility; because the pursuit of progress cannot possibly cast aside the biological enhancement of all species; because, in the final analysis, eugenics is part of our being human. What we can do is to be fully aware of the negative repercussions of such an undertaking and counter them with strong determination.

In conclusion, I have three pieces of advice for those who would like to pursue a career in science. Please, consider that they are not meant to be exhaustive. The problem is of such a magnitude that everyone should feel compelled to ponder it.

First of all, we must explode the really pernicious myths of biological determinism, genetic essentialism – the belief that social problems and individual temperaments arise from inborn and inheritable characters –, and physico-chemical reductionism – the belief that life comes down to mere chemical formulas – which can potentially lead many scientists and engineers to espouse technocratic solutions to massive social problems and, eventually, to an unwitting complicity with illiberal schemes.

Secondly, scientists must keep in mind that every program of social reform generally takes its inception from the demolition of what is regarded as a stale worldview. This is apt to leave a moral vacuum that science by its very nature cannot fill because science is meant to describe and under no circumstances is entitled to prescribe. It follows that science and technology alone cannot either claim to pursue the highest good for mankind or set goals and have the final word in the problem-solving process. After Bertrand Russell, scientists accumulate knowledge but cannot provide wisdom, that being a communal endeavour rather than a professional, elitist monopoly. This was a point completely missed by those German and Swiss biomedical professionals that I described above and that has not been clearly understood by sociobiologists and evolutionary psychologists either, who continue to preach that human conduct should be changed according to biological laws (Roger in Benichou 1989). But those disciplines will share the same fate of phrenology (Lyons 1998).

Thirdly, a liberal view of the relation of science to society must predominate. This calls for the utmost caution on the part of scientists when they advertise their discoveries, take a clear stand on matters of general interest, and conduct experiments on human beings (and animals). They should remember that a truly liberal and democratic society must be founded on the *Socratic combination of knowledge and ignorance* (Dallmayr 1991) that is, the awareness that human beings are not omniscient. As no Hippocratic oath has ever been formulated for bio-scientists, everything is left to their discretion. Therefore they should always seek to be vigilant and to not excessively indulge on the selective suspension of disbelief.

BIBLIOGRAPHY

- AANT ELZINGA, NOLIN JAN, PRANGER ROB, SUNESESON SUNE. 1990. *In science we trust?: moral and political issues of science in society*. Lund: Lund University Press, 1990
- ABELSON, PHILIP H. Fruit from the Tree of Knowledge. *Editorial: Science* 16 July 1965, Volume 149, Number 3681
- ACKERKNECHT, ERWIN H. 1953. *Rudolf Virchow. Doctor, statesman, anthropologist*. Madison: university of Wisconsin press.
- ADAMS, MARK B. 1990 (ed.). *The Wellborn Science*. Oxford, New York: Oxford University Press.
- ADAMS, MARK B. 1994. *The evolution of Theodosius Dobzhansky*. Princeton: Princeton University Press
- ADAMS, MARK B. 2000. Last Judgment: The Visionary Biology of J. B. S. Haldane. *Journal of the History of Biology*. VOL. XXXIII NO. 3 Winter 457-491
- AGAMBEN GIORGIO. 1995. *Homo Sacer*. Bollati Boringhieri: Torino
- AGAMBEN GIORGIO. 1998. *Quel che resta di Auschwitz. L'archivio e il testimone* Bollati Boringhieri: Torino
- AGAR NICHOLAS. 1995. Designing Babies: morally permissible ways to modify the human genome. *Bioethics*, 9.
- AGASSI JOSEPH. 1981. *Science and Society*. Dordrecht, Boston, London: D. Reidel Publishing Company.
- AGAZZI EVANDRO. 1992. *Il bene, il male e la scienza*. Milano: Rusconi.
- AGGER BEN. 1991. Critical Theory, Poststructuralism, Postmodernism: Their Sociological Relevance. *Annual Review of Sociology*. Vol. 17. pp. 105-131.
- ALBERTSON PETER, BARNETT MARGERY (eds.). 1972. *Managing the Planet*. Englewood Cliffs, N.J.: Prentice Hall, Inc.
- ALBRECHT, GARY L., FITZPATRICK RAY, SCRIMSHAW, SUSAN C. 2000. *Handbook of social studies in health and medicine*. London [etc.]: Sage
- ALBRECHT MICHAEL, HINSKE NORBERT (eds.). 1981. *Was ist Aufklärung? Beiträge aus der berlinischen Monatsschrift*. Darmstadt: Wissenschaftliche Buchgesellschaft.
- ALCALÁ ÁNGEL (et al.). 1984. *Inquisición Española y mentalidad inquisitorial*. Barcelona: Ariel.
- ALFIERI VITTORIO. 1983 (1778). *Del principe e delle lettere*. Serra e Riva: Milano
- ALLEN GARLAND. 1976. Genetics, eugenics and society: internalists and externalists in contemporary history of science. *Social Studies of Science*, 6 (1976), 105-122
- ALLEN, GARLAND E. 1978. *Thomas Hunt Morgan. The Man and His Science*. Princeton, New Jersey: Princeton University Press
- ALLEN, GARLAND E. 1979. *Life Science in the Twentieth Century*. Cambridge [etc.]: Cambridge University Press
- ALLEN, GARLAND E. 1983. The misuse of biological hierarchies: the American Eugenics Movement 1900-1940. *History and Philosophy of the Life Science* 5 (1983), 2: 105-128
- ALLEN, G.E. 1986. The Eugenics Record Office at Cold Spring Harbor, 1910-1940: An Essay On Institutional History. *Osiris* (second series), 2: 225-264.
- ALLEN G.E. 1987. The Role of Experts in Scientific Controversy. In *Scientific Controversy: Case Studies in the Resolution and Closure of Disputes in Science and Technology*. Cambridge: Cambridge University Press.
- ALLEN, GARLAND E. 1989. Eugenics and American social history, 1880-1950. *Genome*, Vol. 31: 885-889
- ALLISON, DAVID B. 1995. *The New Nietzsche*. Cambridge Mass., London England: MIT Press
- ANCARANI VITTORIO. 1996. *La scienza decostruita*. Milano: FrancoAngeli.
- AMBROSELLI CLAIRE. *L'éthique médicale*. 1994. Paris: Presses Universitaires de France
- ANDERS GÜNTHER. 1964. *Wir Eichmannsöhne*. München: Beck.
- ANDRESEN STEINAR, SKODVIN TORA, UNDERDAL ARILD, WETTESTAD J. 2000. *Science and politics in international environmental regimes: between integrity and involvement*. Manchester, New York: Manchester University Press.
- ANTISERI DARIO. 2002. *Epistemologia, ermenutica e scienze sociali*. Roma: Luiss edizioni
- ANTONIO, ROBERT J., GLASSMAN, RONALD M. 1985. *A Weber-Marx dialogue* Lawrence, Kan.: University Press of Kansas.
- ANTONIO, ROBERT J. 1989. The Normative Foundations of Emancipatory Theory: Evolutionary Versus Pragmatic Perspectives. *American Journal of Sociology*. Vol. 94, No. 4. pp. 721-748.
- APPEL, STEPHEN W. 1989. "Outstanding individuals do not arise from ancestrally poor stock": racial science and the education of Black South Africans. *The Journal of Negro education*, Vol. 58, Issue 4 (Autumn 1989), 544-557.
- APPLEYARD BRIAN. 1998. *Brave New Worlds. Staying human in the genetic future*. New York: Viking
- ARDITTI RITA, BRENNAN PAT, CAVRAK STEVE (eds.). 1980. *Science and Liberation*. Boston, MA: South End Press
- ARENDT HANNAH. 1960. *Vita Activa, oder vom tätigen Leben*. Stuttgart. W. Kohlhammer Verlag
- ARNOLD DAVID (ed.). 1988. *Imperial Medicine and indigenous societies*. Manchester and New York: Manchester University Press
- ARONOWITZ STANLEY, MARTINSONS BARBARA, MENSER MICHAEL. 1996. *Technoscience and cyberculture*, New York and London: Routledge.
- ASCH, SOLOMON E. 1952. *Social psychology*. Englewood Cliffs, N.J., Prentice-Hall
- ASTOR GERALD. 1985. *The "last" Nazi. The life and times of Dr. Joseph Mengele*. New York: Donald I. Fine
- AUGE MARC, HERZLICH CLAUDINE (eds.). 1984. *Le sens du mal*. Paris : Éditions des archives contemporaines.
- ÁVILA RICARDO, RUIZ, M. TERESA, RIVERA GUILLERMINA (eds.). 2000. *Ensayos sobre millenarismo*. Guadalajara: Universidad de Guadalajara
- AVISE, JOHN C. 1998. The Genetic gods. Evolution and belief in human affairs. Cambridge, London: Harvard University Press
- AYAß WOLFGANG. 1998. *"Gemeinschaftsfremde. Quellen zur Verfolgung von "Asozialen" 1933-1945*. Koblenz: Bundesarchiv.
- BAACKE DIETER, LIENKER HEINRICH, SCHMÖLDER RALF, VOLKMER INGRID (EDS.). 1991. *Jugend 1900-1970. Zwischen Selbstverfügung und Deutung*. Opladen: Leske, Budrich
- BACH ULRICH, DE KLEINE ANDREAS. 1999. *Auf dem Weg in die totale Medizin? Eine Handreichung zur „Bioethik“ – Debatte*. Neukirchen-Vluyn: Neukirchener
- BACHELARD-JOBARD, CATHERINE. 2001. *L'eugénisme, la science et le droit*. Paris: Presses Universitaires de France

- BAJOHR FRANK, JOHE WERNER, LOHALM UWE. 1991. *Zivilisation und Barbarei. Die widersprüchlichen Potentiale der Moderne*. Hamburg: Christians
- BAKER, JOHN R. 1942. *The scientific life*. London: Allen & Unwin LTD
- BAKER, KEITH MICHAEL. 1976. Condorcet. Selected writings. Indianapolis: Bobbs-Merrill Company, Inc.
- BAKER, ROBERT S. 1990. *Brave New World. History, Science, and Dystopia*. Boston: Twayne Publishers
- BALDWIN PETER. 1999. *Contagion and the State in Europe, 1830-1930*. Cambridge [etc.]: Cambridge University Press
- BARBER BERNARD. 1978. Control and Responsibility in the Powerful Professions. *Political Science Quarterly*. Vol. 93, No. 4. pp. 599-615.
- BARBER BERNARD. 1990. *Social Studies of Science*. New Brunswick and London: Transaction Publishers
- BARBER, W.H., BRUMFITT, J. H. etc. (eds.). 1967. *The age of the Enlightenment*. Edinburgh & London: Oliver and Boyd
- BAR-HEIM GABRIEL, WILKES, JOHN M. 1989. A cognitive interpretation of the marginality and under-representation of women in science. *The Journal of Higher Education*, Vol. 60, No. 4 (Jul. - Aug., 1989), 371-387
- BARKAN ELAZAR. 1992. *The retreat of scientific racism*. Cambridge: Cambridge University Press.
- BARKER DAVID. 1989. The biology of stupidity: genetics, eugenics and mental deficiency in the inter-war years. *The British Journal for the History of Science*. 22: 347-75
- BARNABY WENDY. 2000. *The Plague Makers. The secret world of biological warfare*. New York: Continuum
- BARNES BARRY (ed.). 1972. *Sociology of science*. Harmondsworth, Middlesex, England: Penguin Books.
- BARNES BARRY. 1974. *Scientific knowledge and sociological theory*. London and Boston: Routledge & Kegan Paul.
- BARNES BARRY, BLOOR DAVID, HERNY JOHN. 1996. *Scientific knowledge: a sociological analysis*. London: Athlone Press.
- BAROFF, GEORGE S. 2000. Eugenics, "Baby Doc", and Peter Singer: toward a more "perfect" society. *Mental Retardation*. Vol. 38, No. 1, February 2000
- BARROWS SUSANNA. 1981. *Distorting Mirrors. Vision of the Crowd in Late Nineteenth-Century France*. New Haven and London: Yale University Press
- BARRY SMART. 1992. *Modern conditions, postmodern controversies*. London: Routledge.
- BARTA HEINZ, GRABNER-NIEL ELISABETH. 1996. *Wissenschaft und Verantwortlichkeit*. Wien: WUV Universitätverlag.
- BARTELS, DIANNE M., LEROY, BONNIE S., CAPLAN, ARTHUR L. (eds.). 1993. *Prescribing our future. Ethical challenges in Genetic Counseling*. New York: Aldine de Gruyter.
- BAUD JEAN-PIERRE. 2001. *Le droit de vie et de mort. Archéologie de la bioéthique*. Paris: Aubier.
- BAUDOUIN JEAN-LOUIS. 1994. La révolution génétique. *Journal International de bioéthique*. Vol. 5, n. 1.
- BAUER ARNOLD. 1982. *Rudolf Virchow - der politische Arzt*. Berlin: Stapp
- BAUMAN ZYGMUNT. 1989. *Modernity and the holocaust*. Cambridge: Polity Press; Ithaca, N.Y.: Cornell U.P.
- BAJEMA, CARL JAY. 1976. *Eugenics then and now*. Stroudsburg, Pennsylvania: Dowden, Hutchinson & Ross, Inc.
- BAYERTZ KURT. 1983. Naturwissenschaft und Sozialismus: Tendenzen der Naturwissenschafts-Rezeption in der deutschen Arbeiterbewegung des 19. Jahrhunderts. *Social Studies of Science*, Vol. 13, No. 3 (Aug., 1983): 355-394
- BAYERTZ KURT (ed.). 1994a. *The concept of Moral Consensus*. Kluwer Academic Publishers: Dordrecht, Boston, London.
- BAYERTZ KURT. 1994b. *GenEthics. Technological intervention in human reproduction as a philosophical problem*. Cambridge: Cambridge University Press
- BAYERTZ KURT, PORTER ROY. 1998. *From physico-theology to bio-technology*. Rodopi: Amsterdam, Atlanta.
- BECKER, EMIL P. 1990. *Sozialdarwinismus, Rassismus, Antisemitismus und Völkischer Gedanke*. Stuttgart, New York: Georg Thieme.
- BECKER, GERHOLD K., BUCHANAN, JAMES P. (eds.). 1996. *Changing Nature's course. The ethical challenge of biotechnology*. Hong Kong: Hong Kong University Press
- BECK, FENWICK LYNDA. 1998. *Private choices, public consequences. Reproductive technology and the new ethics of conception, pregnancy, and family*. New York: Dutton/Penguin Books
- BECKWITH JON. 1993. A historical view of social responsibility in genetics. *BioScience*, Vol. 43, No. 5: 327-333 1993
- BECKWITH JON. 2002. Making Genes, Making Waves. A social activist in science. Cambridge, London: Harvard University Press
- BELKNAP, ROBERT L. 1990. *The genesis of the Brothers Karamazov. The aesthetics, ideology, and psychology of text making*. Evanston, Illinois: Northwestern University Press
- BELTRÃO MARQUES, VERA REGINA. 1994. *A medicalização da raça: médicos, educadores e discurso eugênico*. Barão Geraldo, Campinas, Brasil: Editora da Unicamp
- BENDIX REINHARD. 1965. Max Weber and Jakob Burckhardt. *American Sociological Review*, Vol. 30, No. 2, pp. 176-184
- BENDIX REINHARD. 1970. Sociology and the Distrust of Reason. *American Sociological Review*. Vol. 35, No. 5. pp. 831-843.
- BENICHOU CLAUDE (ed.). 1989. *L'ordre des caracteres. Aspects de l'hérédité dans l'histoire des sciences de l'homme*. Paris: Vrin
- BENKENDORF JUDITH L., PRINCE MICHELE B. 2002. A conversation about the indirect road to non directive genetic counseling: a defining moment through research. *Journal of Genetic Counseling*, Vol. 11, No. 4, August 2002
- BEREANTO, PHILIP L. (ed.). 1976. *Technology as a social and political phenomenon*. New York: John Wiley & Sons.
- BERG MANFRED, COCKS GEOFFREY (eds). 1997. *Medicine and modernity*. Cambridge: Cambridge University Press.
- BERLIN ISAAH. 1990. *The crooked timber of humanity: chapters in the history of ideas*. London: John Murray.
- BERLINGUER GIOVANNI. 1991. *Questioni di vita: etica, scienza, salute*. Torino: Einaudi.
- BERMAN MARSHALL. 1983. *All that is solid melts into air: the experience of modernity*. London: Verso.
- BERNAL, J.D. 1970. *The World, the flesh and the devil*. London: Jonathan Cape
- BERNARDINI CARLO, MINERVA DANIELA. 1992. *L'ingegno e il potere*. Firenze: Sansoni editore.
- BERNARDINI GENE. The origins and development of racial anti-Semitism in Fascist Italy. *The Journal of Modern History*, vol. 49, No. 3 (Sep., 1977), 431-453
- BERNARDINI JEAN-MARC. 1997. *Le darwinisme social en France (1859-1918)*. Paris: CNRS Éditions
- BERNSTEIN, RICHARD J. (ed.). 1985. *Habermas and modernity*. Cambridge. Polity Press.
- BERRY, J.W. DASEN P.R., SARASWATHI T.S. (Eds). 1997. *Handbook of Cross-Cultural Psychology: Basic Processes and Human Development*. Boston: Allyn & Bacon.
- BIESECKER, BARBARA BOWLES. 2003. Back to the future of genetic counseling: commentary on "psychosocial genetic counseling in the post-nondirective era" *Journal of Genetic Counseling*, Vol. 12, No. 3, June 2003: 213-217
- BINION RUDOLPH. 1998. More men than corn: Malthus versus the Enlightenment. *Eighteenth-century studies*, vol. 32, n. 4

- BIRKE LYNDA, HUBBARD RUTH (eds.). 1995. *Reinventing biology. Respect for life and the creation of knowledge*. Bloomington and Indianapolis: Indiana university press.
- BLANCKAERT CLAUDE, FISCHER, JEAN-LOUIS, REY ROSELYNE (eds.). 1995. *Nature, histoire, société*. Paris: Klincksieck
- BLECKER JOHANNA (ed.). 1993. *Medizin im "Dritten Reich"*. Köln: Deutscher Ärzte-Verlag
- BLOOM HAROLD (ed.). 1986. *Thomas Mann's the magic mountain*. New York [...]: Chelsea House Publishers
- BLUME, STUART S. 1974. *Toward a political sociology of science*. New York, London: the Free Press.
- BLUME STUART S., BUNDERS JOSKE, LEYDESDORFF LOET, WHITLEY RICHARD (eds.). 1987. *The social direction of the public sciences*. Dordrecht, Boston, Lancaster, Tokyo: D. Reidel Publishing company.
- BODMER W.F., CAVALLI-SFORZA L.L. 1976. *Genetics, Evolution, and Man*. San Francisco: W.H. Freeman & Co.
- BO OZ WOJCIECH, HÖVER GERHARD (Eds.). 2002. *Utilitarismus in der Bioethik*. Münster, Hamburg, London: LIT
- BONETTA GAETANO. 1990. *Corpo e nazione. L'educazione igienica, ginnastica e sessuale nell'Italia liberale*. Milano: FrancoAngeli.
- BORIONI ANNA, PIERI MASSIMO. 1991. *Maledetta Isabella, maledetto Colombo*. Venezia: Marsilio
- BOSK, CHARLES L. 1992. *All God's mistakes. Genetic counseling in a pediatric hospital*. Chicago and London: University of Chicago
- BOUDON RAYMOND. 1999. *Les sens des valeurs*. Paris: Presses Universitaires de France.
- BOUDON RAYMOND, DI NUSCIO ENZO, LINS HAMLIN CYNTHIA. 2000. *Spiegazione scientifica e relativismo culturale*. Roma: Luiss Edizioni.
- BOUDON RAYMOND. 1986. *L'ideologie. L'origine des idées reçues*. Paris: Fayard.
- BOURDIEU PIERRE. 2001. *Science de la science et réflexivité*. Paris: Raison d'agir editions.
- BOURRIOT FÉLIX. 1995. *Kalos kagathos – kalokagathia. D'un terme de propagande de sophistes à une notion sociale et philosophique*. Hildesheim, Zürich, New York: Georg Olms Verlag
- BOWLER, PETER J. 1989. *The Mendelian revolution: the emergence of hereditarian concepts in modern science and society*. Baltimore, Md.: Johns Hopkins university press.
- BRACKETT, D.W. 1996. *Holy Terror. Armageddon in Tokyo*. New York, Tokyo: Weatherhill.
- BRANSON JAN, MILLER DON. 2002. *Damned for their difference: the cultural construction of deaf people as disabled*. Washington D.C.: Gallaudet University Press
- BRAUN LEV. 1974. *Witness of decline. Albert Camus: Moralist of the Absurd*. Rutherford [etc.]: Fairleigh Dickinson University Press
- BRECHT BERTOLT. 1963. *Leben des Galilei*. Frankfurt am Main: Suhrkamp.
- BREMAN JAN, DE ROY PIET, STOLER ANN, WERTHEIM, WIM F (eds.). 1990. *Imperial Monkey Business. Racial supremacy in social Darwinist theory and colonial practice*. Amsterdam: VU University Press
- BRENTJES BURCHARD (ed.). 1992. *Wissenschaft unter dem NS-Regime*. Berlin [etc.]: Peter Lang.
- BROBERG GUNNAR, ROLL-HANSEN NILS (eds.). 1996. *Eugenics and the welfare state*. East Lansing: Michigan State University Press.
- BRODY HOWARD, M.D. 1992. *The Healer's Power*. New Haven and London: Yale University Press
- BROWN IAN. 1988. Who were the eugenicists? A study of the formation of an early twentieth-century pressure group. *History of Education* 17 (1988): 295-307.
- BROWNHILL ROBERT, MERRICKS LINDA. 2002. Ethics and Science: Educating the Public. *Science and Engineering Ethics*. Volume 8 Number 1.
- BRUBAKER ROGER. 1984. *The limits of rationality*. London: George Allen & Unwin.
- BRYANT, CLIFTON D. (ed.). 1990. *Deviant behaviour. Readings in the sociology of norm violations*. New York [etc.]: Hemisphere Publishing Corporation
- BUCHANAN ALLEN (et al.). 2000. *From chance to choice: genetics and justice*. Cambridge: Cambridge University Press.
- BUCCHI MASSIMIANO. 2002. *Scienza e Società*. Bologna: il Mulino.
- BULLEN, R.J., POGGE VON STRANDMANN, H., POLONSKY, A.P. 1984. *Ideas into politics: aspects of European history 1880-1950*. London and Sidney: Croom Helm
- BURLEIGH MICHAEL, WIPPERMANN WOLFGANG. 1991. *The racial state: Germany 1933-1945*. Cambridge: Cambridge University Press
- BURLEIGH MICHAEL (ed.). 1997. *Ethics and extermination*. Cambridge: Cambridge University Press.
- BURLEIGH MICHAEL. 2000a. *Die Zeit des Nationalsozialismus*. Frankfurt am Main: S. Fisher.
- BURLEIGH MICHAEL. 2000b. *The Third Reich*. London: Macmillan.
- BURLEIGH MICHAEL. 2002. *Death and deliverance: 'euthanasia' in Germany, c. 1900-1945*. London: Pan Books.
- BURLEY JUSTINE (ed.). 1999. *The genetic revolution and human rights*. Oxford: Oxford University Press
- BURLEY JUSTINE, HARRIS JOHN. 2002. *A companion to genetics*. Malden, Mass., Oxford: Blackwell publishers
- BURNETT LEON (ed.). 1981. *F.M. Dostoevsky (1821-1881): a centenary collection*. University of Essex
- BURROW J.W. 2000. *The Crisis of Reason: European Thought, 1848-1914*. New Haven: Yale University Press
- BUSINO GIOVANNI. 1998. *Sociologie des sciences et des techniques*. Paris: Presses Universitaires de France.
- BUTLER DECLAN. 1997. France reaps benefits and costs of going by the book. *Nature* 389: 661 – 662.
- BUTLER, J.A.V. 1976. *Modern Biology and its human implications*. New York: Crane, Russak & Company, Inc.
- BUZZATI-TRAVERSO ADRIANO. 1977. *The scientific enterprise, today and tomorrow*. Paris: UNESCO
- BYRNE, KEVIN B. (ed.). 1986. *Responsible Science. The impact of technology on society*. San Francisco: Harper & Row
- CABANIS, PIERRE JEAN GEORGE. 1956. *Oeuvres Philosophiques* (Tome I). Paris: Presses universitaires de France
- CABANIS, PIERRE JEAN GEORGE. 1981. *On the relations between the physical and moral aspects of man*. Baltimore and London: Johns Hopkins University Press
- CAMUS, ALBERT. 1942. *Le mythe de Sisyphe : essai sur l'absurde*. Paris: Gallimard.
- CAMUS ALBERT. *La peste*. Paris: Gallimard, 1947.
- CANGUILHEM GEORGES. 1972. *Le normal et le pathologique*. Paris : Presses Universitaires de France.
- CANGUILHEM GEORGES. 1994. *Études d'Histoire et de Philosophie des Sciences*. Paris : J. Vrin.
- CANTOR DAVID. 2001. Cancer and the Nazis. *Science as Culture* (2001) 10: 121-133.
- CAPLAN, ARTHUR L. (ed.). 1992. *When medicine went mad. Bioethics and the Holocaust*. Totowa, New Jersey: Humana Press.
- CAPLAN, ARTHUR L. 1997. *Am I my brother's keeper? The ethical frontiers of biomedicine*. Bloomington and Indianapolis: Indiana University Press

- CÁRCEL, RICARDO GARCÍA. 1990. *La inquisición*. Madrid: Anaya.
- CAREY JOHN. 1992. *The intellectuals and the masses. Pride and Prejudice among the literary intelligentsia, 1880-1939*. London & Boston: Faber & Faber
- CARLSON, ELOF AXEL. 1981. *Genes, radiation, and society. The life and work of H.J. Muller*. Ithaca and London: Cornell University Press
- CARLSON, ELOF AXEL. 1984. *Human Genetics*. Lexington, Mass., Toronto: D.C. Heath and Company
- CARNEY, THOMAS P. 1980. *Instant Evolution. We'd better get good at it*. Notre Dame, London: University of Notre Dame Press
- CAROL ANNE. 1995. *Histoire de l'eugénisme en France*. Paris: Seuil
- CAVALIERI, LIEBE F. 1981. *The double-edged helix*. New York: Columbia University Press
- CLARKE MARY. 1986. Craniometry and eugenics in Australia: R.J.A. Berry and the quest for social efficiency. *Historical Studies* vol. 22, n. 86: 35-53
- CERRONI UMBERTO et al. 1975. *Scienza e potere*. Milano: Feltrinelli
- CERRUTI LUIGI, FAZIO SILVANA (eds.). 1976. *Scienziati e crisi della scienza*. Bari: De Donato.
- CHAMBERLIN, J. EDWARD, SANDER, L. GILMAN. 1985. *Degeneration. The dark side of progress*. New York: Columbia University Press
- CHESTERTON, GILBERT KEITH. 1922. *Eugenics and other evils*. London [etc.]: Cassell & Company, Limited
- CHILDERS THOMAS, CAPLAN JANE (eds.). 1993. *Re-evaluating the Third Reich*. New York, London: Holmes & Meier
- CHILDS, DONALD J. 2001. *Modernism and eugenics. Woolf, Eliot, Yeats, and the culture of degeneration*. Cambridge [etc.]: Cambridge University Press
- CHUNG, YUE HESEN JULIETTE. 2002. *Struggle for national survival. Eugenics in sino-japanese contexts 1890-1945*. New York & London: Routledge
- CIARFARDONE RAFFAELE. 1978. *L'illuminismo tedesco. Metodo filosofico e premesse etico-teologiche (1690-1765)*. Rieti: Il Velino
- CIBA FOUNDATION SYMPOSIUM. 1972. *Civilization and science. In conflict or collaboration?* Amsterdam [...]: Associated Scientific Publishers
- CIPOLLA CARLO M. 1992. *Miasmas and disease. Public Health and the environment in the pre-industrial Age*. New Haven and London: Yale university Press
- CLARK, RONALD W. 1960. *Mr Julian Huxley*. London: Phoenix House LTD
- CLARK, STEPHEN R.L. 1993. *How to think about the earth: philosophical and theological models for ecology*. London; New York: Mowbray.
- CLARKE ANGUS (ed.). 1994. *Genetic counselling. Practice and principles*. London and New York: Routledge
- CLARKE ANGUS (ed.). 1996. Population screening for genetic susceptibility to disease. *British Medical Journal*. 311, 35-38
- CLEMINSON RICHARD. 2000. *Anarchism, science, and sex: eugenics in eastern Spain, 1900-1937*. Bern: Peter Lang
- COHEN, BERNARD I. 1990. *Puritanism and the rise of modern science*. New Brunswick and London: Rutgers University Press
- COHEN, BERNARD I. & SMITH, GEORGE E. (eds.). 2002. *The Cambridge companion to Newton*. New York: Cambridge University Press
- COHEN PAMELA E., WERTZ DOROTHY C., NIPPERT IRMGARD, WOLFF GERHARD. 1997. Genetic counseling practices in Germany: a comparison between East German and West German geneticists. *Journal of Genetic Counseling*. Vol. 6, No. 1, 1997: 61-80.
- COLE, LEONARD A. 1983. *Politics and the restraint of science*. Totowa (NJ): Rowman & Allanheld
- COLE STEPHEN. 1995. *Making Science: between Nature and Society*. Cambridge, Massachusetts, London, England: Harvard University Press
- COLE-TURNER, RONALD (ed.). 2001. *Beyond Cloning. Religion and the remaking of Humanity*. Harrisburg, Pennsylvania: Trinity Press International
- COLLA, PIERO S. 2000. *Per la nazione e per la razza*. Roma: Carocci.
- COLLOTTI ENZO. 1994. *Fascismo, fascismi*. Milano: Sansoni
- COLOMBO ARRIGO (ed.). 1987. *Utopia e Distopia*. Milano: FrancoAngeli
- CONDI'I, CELESTE MICHELLE. 1999. *The Meanings of the Gene. Public Debates about human heredity*. Madison: The university of Wisconsin Press
- CONDORCET M.J.A.N. 1790. *Esquisse d'un tableau historique des progresse de l'esprit humain*. Paris: J.Vrin
- CONNOR WALKER. 1994. *Ethnonationalism: The Quest for Understanding*. Princeton: Princeton University Press.
- CONRAD PETER, GABE JONATHAN (eds.). 1999. *Sociological perspectives on the new genetics*. Blackwell Publishers: Oxford
- CONTE ÉDOUARD, ESSNER CORNELIA. 1995. *La quête de la race. Une anthropologie du nazisme*. Paris, Hachette.
- COOKE, KATHY J. 1998. The Limits of Heredity: Nature and Nurture in American Eugenics Before 1915 *Journal of the History of Biology* 31: 263-278.
- COOKE, KATHY J. 2002. Duty or Dream? Edwin G. Conklin's Critique of Eugenics and Support for American Individualism. *Journal of the History of Biology* 35: 365-384.
- COOTER ROGER. 1984. *The cultural meaning of popular science: phrenology and the organization of consent in nineteenth-century Britain*. Cambridge [etc.]: Cambridge University Press
- CORDING CLEMENS. 2000. *Die Regensburger Heil- und Pflgeanstalt Karthaus-Prüll im „Dritten Reich“. Eine Studie zur Geschichte der Psychiatrie im Nationalsozialismus*. Würzburg: Deutscher Wissenschafts-Verlag
- COTTINGHAM JOHN. 1992. *The Cambridge companion to Descartes*. Cambridge; New York: Cambridge University Press.
- CHIEFFI LORENZO. 2000. *Bioetica e diritti dell'uomo*. Torino: Paravia.
- COSMACINI GIORGIO. 1989. *Medicina e sanità in Italia nel ventesimo secolo*. Roma, Bari: Laterza.
- CROOK NORA (ed.). 1996. *The novels and selected works of Mary Shelley. Frankenstein or the modern Prometheus*. London: William Pickering
- CROOK PAUL. 2002. American eugenics and the Nazis: recent historiography. *The European legacy*, vol. 7, no. 3, pp. 363-381
- CROW, JAMES F. 2002. Unequal by nature. A geneticist's perspective on human differences. *Daedalus*, Winter 131
- CUNNINGHAM ANDREW, JARDINE NICHOLAS (eds.). 1990. *Romanticism and the sciences*. Cambridge [etc.]: Cambridge University Press.
- DAINIAN FAN, COHEN, ROBERT S. 1996. *Chinese studies in the History and Philosophy of Science and Technology*. Dordrecht: Kluwer Academic.
- DALE, PETER N. 1986. *The Myth of Japanese Uniqueness*. New York: St. Martin's Press

- DALLMAYR, FRED R. 1991. *Life-world, modernity, and critique: paths between Heidegger and the Frankfurt School*. Cambridge, UK: Polity Press.
- DAMICO, ALFONSO J. 1982. The sociology of justice: Kohlberg and Milgram. *Political theory*, Vol. 10, No. 3 (Aug., 1982), 409-433
- DANFORTH SCOT. 2000. What can the field of developmental disabilities learn from Michel Foucault? *Mental Retardation*. Vol. 38, No. 4, A 2000
- DANIELS, GEORGE H. 1967. The pure science Ideal and Democratic Culture. *Science*, New Series, Vol. 156, No. 3783 (Jun. 30, 1967), 16: 1705.
- DARBY TOM, EGYED BÉLA, JONES BEN (eds.). 1989. *Nietzsche and the rhetoric of nihilism*. Ottawa, Carleton university press
- DARNTON ROBERT. 1968. *Mesmerism and the end of the Enlightenment in France*. Cambridge, Mass., and London, England: Harvard University Press
- DARWIN LEONARD. 1916. On the statistical enquiries needed after the war in connection with eugenics. *Journal of the Royal Statistical Society* 159-188
- DASTON LORRAINE, GALISON PETER. 1992. The image of Objectivity. *Representation* 40, Fall 1992
- DAVIES, JOHN D. 1955. *Phrenology: fad and science. A 19th-century American Crusade*. New Haven: Yale University Press.
- DAVIS, BERNARD D. 1986. *Storm over biology. Essays on science, sentiment, and public policy*. Buffalo, New York: Prometheus Books.
- DAVIS, NANETTE J. ANDERSON BO. 1983. *Social Control: the production of deviance in the Modern State*. NY: Irvington
- DAVISON RAY. 1997. *Camus: the challenge of Dostoevsky*. Exeter: University of Exeter Press.
- DEBARATI SANYAL. 2000. Broken engagements. *Yale French Studies*, No. 98, The French Fifties (2000), 29-49
- DEDIEU JEAN-PIERRE. 1992. *L'administration de la foi*. Madrid: Casa de Velázquez.
- DEERY JUNE. 1996. *Aldous Huxley and the mysticism of science*. Houndmills, London: Macmillan
- DE GIUSTINO DAVID. 1975. *Conquest of mind. Phrenology and Victorian social thought*. London: Croom Helm
- DEICHMANN UTE. 1996. *Biologists under Hitler*. Cambridge, Mass.: Harvard University Press.
- DEICHMANN UTE. 2000. An unholy alliance. *Nature* 405, 739.
- DELANITY GERALD. 2001. *Challenging knowledge: the university in the knowledge society*. Buckingham: Society for Research into Higher Education : Open University Press.
- DENNET, DANIEL CLEMENT. 1984. *Elbow room: the varieties of free will worth wanting*. Oxford: Clarendon.
- DENNIS, RUTLEDGE M. 1995. Social Darwinism, Scientific Racism and the Metaphysics of Race. *The Journal of Negro Education*, volume 64, Issue 3, 243-252
- DE SÈVE MICHEL, LANGLOIS SIMON (eds.). 1999. *Savoir et responsabilité*. Quebec : Éditions Nota bene
- DETWILER BRUCE. 1990. *Nietzsche and the politics of aristocratic radicalism*. Chicago and London: The University of Chicago Press
- DHOMBRES NICOLE AND JEAN. 1989. *Naissance d'un nouveau pouvoir: sciences et savants en France 1793-1824*. Paris: Payot
- DHOMBRES NICOLE. 1989. *Les savants en révolution 1789-1799*. Cité de La Villette: Paris
- DIKOTTER FRANK. 1998. Race Culture: Recent Perspectives on the History of Eugenics, *The American Historical Review*. Vol. 103, No. 2, pp. 467-478.
- DOBBS, BETTY JO TEETER. 1975. *The foundations of Newton's alchemy, or, The hunting of the Greene Lyon*. Cambridge: Cambridge University Press, 1975.
- DODD W.J. 1992. *Kafka and Dostoyevsky. The shaping of influence*. Houndsmills, Basingstoke, Hampshire and London: MacMillan
- DOOB ANTHONY, GROSS ALAN. 1968. Status of frustrator as an inhibitor of horn-honking responses. *Journal of Social Psychology*, 76, 213-218.
- DOSTOEVSKIJ, FËDOR MICHAÏLOVIÇ. 1912. *The brothers Karamazov*, London: Heinemann.
- DOU ALBERTO (ed.). 1987. *Ciencia y poder*. Madrid: UPCM
- DOUGLAS MARY. 1996. *Purity and Danger: an Analysis of Concepts of Pollution and Taboo*. Routledge: London/New York
- DRECHSEL KLAUS-PETER. 1993. *Beurteilt, Vermessen, Ermordet. Die Praxis der Euthanasie bis zum Ende des deutschen Faschismus*. Duisburg: Diss.
- DROUARD ALAIN. 1992. Aux origines de l'eugénisme en France: le néo-malthusianisme (1896-1914), *Population*, 2, 1992, 435-460
- DROUARD ALAIN. 1999. Concerning eugenics in Scandinavia. An evaluation of recent research and publications. *Population: an English selection*, vol. 11, 261-270
- DUBOIS MICHEL. 2000. *La Sociologie de Raymond Bondon*. Paris : Presses Universitaires de France.
- DUBOS RENÉ. 1961. *The dreams of reason. Science and Utopias*. New York and London: Columbia University Press
- DUBOS RENÉ. 1962. *The torch of life. Continuity in living experience*. New York: Pocket Books
- DUBOW SAUL. 1989. *Racial segregation: and the origins of Apartheid in South Africa, 1919-36*. Houndsmills, Basingstoke, Hampshire and London: MacMillan
- DUBOW SAUL. 1992. Afrikaner Nationalism, Apartheid and the conceptualisation of "Race". *The Journal of African History*, Vol. 33, No. 2 (1992), 209-237
- DUFRESNE JACQUES. 1986. *La reproduction humaine industrialisée*. Québec: Institut québécois de recherche sur la culture
- DUNN, L.C. (ed.). 1951. *Genetics in the 20th century*. New York: MacMillan Company.
- DUNN L.C. 1962. Cross-Currents in the History of Human Genetics. *American Journal of human genetics* 12 1962: 1-13
- DURBIN, PAUL T. 1990. *Broad and narrow interpretations of philosophy of technology*. Dordrecht; Boston: Kluwer Academic Publishers.
- DUSTER TROY. 1990. *Backdoor to eugenics*. New York, London: Routledge
- EASLEA BRIAN. 1973. *Liberation and the aims of science: an essay on obstacles to the building of a beautiful world*, London: Chatto and Windus for Sussex University Press.
- EBBINGHAUS ANGELIKA, DÖRNER KLAUS (Eds.). 2001. *Vernichten und Heilen. Der Nürnberger Ärzteprozeß und seine Folgen*. Berlin: Aufbau
- EHRENSTRÖM PHILIPPE. 1993. Eugénisme et santé publique: la stérilisation légale des maladies mentales dans le Canton de Vaud. *History and Philosophy of the Life Science* 15 (1993): 105-128
- EICHNER HANS. 1982. The rise of modern science and the genesis of romanticism. *PMLA*, vol. 97, No. 1 (Jan., 1982), 8-30.
- ELIAS NORBERT, MARTINS HERMINIO, WHITLEY RICHARD. 1982. *Scientific Establishments and Hierarchies*. Dordrecht, Boston, London: D. Reidel Publishing Company.
- ELLIOTT CARL. 2003. Humanity 2.0. *Wilson Quarterly*. Autumn 2003

- ELLIOTT, A. ARNETT, HOOD, C. THOMAS, HOLMES, JACK E. 1972. The working scientist as political participant. *The Journal of politics*, vol. 34, No. 2 (May, 1972), 399-427
- ELLIOTT, CLARK A. 1982. Models of the American scientist: a look at collective biography. *Isis*, Vol. 73, No. 1 (Mar., 1982), 77-93
- ELLIS, JACK D. 1990. *The physician-legislators of France: medicine and politics in the early Third Republic, 1870-1914*. Cambridge, etc.: Cambridge University Press
- ELSTNER MARCUS (ed.). 1997. *Gentechnik, Ethik und Gesellschaft*. Berlin [etc.]: Springer
- ENGELHARDT, H. TRISTRAM JR. 1986. *The foundations of bioethics*. New York, Oxford: Oxford University Press
- ENGELS, EVE-MARIE, JUNKER, THOMAS, WEINGARTEN MICHAEL. 1998. *Ethik der Biowissenschaften: Geschichte und Theorie*. Berlin: Verlag für Wissenschaft und Bildung
- ERNST WALTRAUD, HARRIS BERNARD (eds.). 1999. *Race, science and medicine, 1700-1960*. London: Routledge.
- ESSED PHILOMENA, GOLDBERG, DAVID THEO (eds.). 2002. *Race critical Theories. Text and Context*. Malden Mass.: Blackwell Publishers
- EURICH NELL. 1967. *Science in utopia. A mighty design*. Cambridge, Mass.: Harvard University Press
- EZRAHI YARON, MENDELSON EVERETT, SEGAL HOWARD. 1993. *Technology, Pessimism, and Postmodernism*. Dordrecht, Boston, London: Kluwer Academic Publishers.
- FAITH-WEISS SHEILA. 1987. The race-hygiene movement in Germany. *OSIRIS*, 2nd series, 3: 193-236
- FANGERAU HEINER. 2001. *Etablierung eines rassenhygienischen Standardwerkes 1921-1941*. Frankfurt am Main [etc.]: Peter Lang
- FARRALL, LINDSAY ANDREW. 1985. *The origins and growth of the English eugenics movement 1865-1925*. New York, London: Garland publishing
- FARRINGTON BENJAMIN. 1946. *Science and Politics in the Ancient World*. London: George Allen & Unwin Ltd.
- FASCHING, DARREL J. 1993. *The ethical challenge of Auschwitz and Hiroshima*. Albany: State University of New York Press
- FEFFER ANDREW. 1993. *The Chicago Pragmatists and American Progressivism*. Ithaca and London: Cornell University Press.
- FEINBERG GERALD. 1969. *The Prometheus Project*. Garden City, New York: Doubleday & Company, Inc.
- FELDMAN FRED. 1992. *Confrontations with the Reaper. A philosophical study of the nature and value of death*. New York, Oxford: Oxford University Press
- FERRONE VINCENZO, ROCHE DANIEL. 1997. *L'illuminismo. Dizionario Storico*. Roma-Bari: Edizioni Laterza
- FIELD, JAMES A. 1911. The Progress of Eugenics. *The Quarterly Journal of Economics*. 1911:1-67
- FINI MARCO (ed.). 1976. 1945-1975. *ITALIA: fascismo antifascismo Resistenza rinnovamento*. Milano: Feltrinelli
- FINK LEON. 1997. *Progressive Intellectuals and the Dilemmas of Democratic Commitment*. Cambridge Massachusetts, London England: Harvard University Press.
- FINZSCH NORBERT, WELLENREUTHER HERMANN (ed.). 2001. *Visions of the future in Germany and America*. Oxford and New York: Berg. Oxford and New York
- FINZSCH NORBERT, SCHIRMER DIETMAR. 1998. *Identity and intolerance. Nationalism, racism, and xenophobia in Germany and the United States*. Cambridge: Cambridge University Press.
- FORMAN PAUL. 1973. Scientific internationalism and the Weimar Physicists: the ideology and the manipulation in Germany after World War I. *Isis*, Vol. 64, No. 2 (Jun., 1973), 150-180
- FORTI AUGUSTO, BISOGNO PAOLO (et al.). 1996. *Scienza e potere*. Milano: FrancoAngeli
- FOUCAULT MICHEL. 1970. *The order of things: an archaeology of the human sciences*. London: Tavistock Publications.
- FOUCAULT MICHEL. 1975. *Surveiller et punir : naissance de la prison*. Paris: Gallimard.
- FOUCAULT MICHEL. 1976. *Histoire de la folie à l'âge classique*. Paris: Gallimard.
- FOUCAULT MICHEL. 1980. *Power/Knowledge: Selected Interviews and Other Writings 1972-1977*. New York: Pantheon Books.
- FOUCAULT MICHEL. 1981. *Omnes et Singulatim*. In *The Tanner Lectures on Human Values*. Cambridge: Cambridge University Press.
- FOUCAULT MICHEL. 1994a. *Biopolitique et libéralisme*. Paris : Gallimard.
- FOUCAULT MICHEL. 1994b. *Dits et Écrits*. Paris Gallimard
- FREEDEN MICHAEL. 1979. Eugenics and progressive thought: a study in ideological affinity. *The historical journal*, 22, 3 (1979), pp. 645-671
- FREWER ANDREAS. 2000. *Medizin und Moral in Weimarer Republik und Nationalsozialismus*. Frankfurt / New York: Campus Verlag
- FRIEDLANDER SAUL (ed.). 1992. *Probing the limits of representation: Nazism and the "final solution"*. Cambridge, Mass: Harvard University Press.
- FRIEDLANDER HENRY. 1995. *The origins of Nazi genocide: from euthanasia to the final solution*. Chapel Hill London: University of North Carolina Press.
- FROLOV IVAN. 1990. *Man, Science, Humanism. A New Synthesis*. Buffalo, New York: Prometheus Books
- FRÜHSTÜCK SABINE. 1997. *Die Politik der Sexualwissenschaft*. Wien: Institut für Japanologie.
- FRÜHSTÜCK SABINE. 1998. Germs, Genes, and Nerves: Programming the Body in Modern Japanese Medicine and Allied Science, Abstract of the 1998 AAS Annual Meeting, Session 174 (www.aasianst.org/absts/1998abst/japan/j174.htm)
- FULFORD K.W.M., GILLET, GRANT R., MARTIN SOSKICE, JANET (eds.). 1994. *Medicine and moral reasoning*. Cambridge [etc.]: Cambridge University Press
- FULLER WATSON (ed.). 1971. *The social impact of Modern Biology*. London: Routledge & Kegan.
- GABBAY JOHN, WEBSTER CHARLES ET AL. 1983. Mental Handicap and Education. *Oxford Review of Education*, Vol. 9, Number 3
- GENERAL INTRODUCTION by John Gabbay & Charles Webster
- GABRIEL EBERHARD, NEUGEBAUER WOLFGANG (eds.). 2000. *NS-Euthanasie in Wien*. Wien, Köln, Weimar: Böhlau Verlag
- GANNETT LISA. 2001. Racism and human genome diversity research: the ethical limits of "Population thinking". *Philosophy of Science*, 479-492
- GALSTON ARTHUR W., SHURR, EMILY G. (eds.). 2001. *New Dimensions in Bioethics*. Norwell, MA: Kluwer Academic Publishers.
- GALTON DAVID. 2001. *Eugenics. The future of human life in the 21st century*. London: Abacus
- GALTON FRANCIS. 1883. *Inquiries into human faculty and its development*. London: Macmillan.
- GALTON FRANCIS. 1904. Eugenics: Its Definition, Scope, and Aims. *The American Journal of Sociology*: 1-25
- GANSSMÜLLER CHRISTIAN. 1987. *Die Erbgesundheitspolitik des Dritten Reiches*. Köln, Wien: Böhlau Verlag

- GASMAN, DANIEL. 1971. *The scientific origins of National Socialism: social Darwinism in Ernst Haeckel and the German Monist League*. London: Macdonald and Co.
- GAUROGLU KOSTAS, STACHEL JOHN, WARTOFSKY, MARX W. (eds). 1995. *Science, Politics, and Social Practice* Dordrecht, Boston, London: Kluwer Academic Publishers.
- GAY PETER. 1969. *The Enlightenment: an interpretation. Vol.2, The science of freedom*. London: Weidenfeld & Nicolson, 1969
- GELB, STEVEN A. 2000. „Be cruel” Dare we take Foucault seriously? *Mental Retardation*. Vol. 38, No. 4, August 2000
- GELLNER, ERNEST. 1974. *Legitimation of belief*. London: Cambridge University Press, Stesso pensiero di Nigel.
- GELLNER, ERNEST. 1985. *Relativism and the social sciences*. Cambridge: Cambridge University Press.
- GELLNER ERNEST. 1992. *Reason and culture: the historic role of rationality and rationalism*. Oxford; Cambridge, Mass.: Blackwell.
- GUERLAC HENRY. 1975. *Antoine-Laurent Lavoisier. Chemist and revolutionary*. New York: Charles Scribner's Sons
- GEYER CHRISTIAN (ed.). 2001. *Biopolitik: Die Positionen*. Frankfurt am Mein: Suhrkamp.
- GIANFERRARI LUISA, CANTONI GIUSEPPE. 1945. *Manuale di Genetica: con particolare riguardo all'eredità dell'uomo*. Milano: Vallardi.
- GIANNOS, PHILLIP L. 1974. Scientists as Policy Advisers: the context of influence. *The Western political quarterly*, Vol. 27, No. 3. (Sep., 1974), 429-456
- GILLHAM, NICHOLAS WRIGHT. 2001. *A life of Sir Francis Galton*. Oxford [etc.]: Oxford University Press
- GILLETTE AARON. 2002. *Racial theories in fascist Italy*. London & New York: Routledge.
- GILMAN, STUART C. 1982. Degeneracy and race in the nineteenth century. *The Journal of Ethnic Studies*. 10:4 Winter
- GINSBURG, FAYE D., RAPP RAYNA. 1995. *Conceiving the new world order: The global politics of reproduction*. Berkeley [...]: University of California Press
- GIOVE NICOLETTA. 2001. *Le razze in provetta: Georges Vacher de Lapouge e l'antropologia sociale razzista*. Padova: Il Poligrafo.
- GIRARD RENÉ. 1972. *Le violence et le sacré*. Paris: Bernard Grasset
- GIVEN, JAMES B. 1997. *Inquisition and medieval society. Power, discipline, and resistance in Languedoc*. Ithaca and London: Cornell University Press.
- GLANNON WALTER. 1998. Genes, embryos and future people. *Bioethics*, 12.
- GLASS DARYL. 2001. *Politics and Society in South Africa. A critical introduction*. London [etc.]: Sage Publications
- GLASER HERMANN. 1978. *The cultural roots of National Socialism*. Austin: University of Texas Press.
- GLASS BENTLEY. 1972. Heredity and ethical problems. *Perspectives in Biology and Medicine* 15,2 Winter 1990
- GLASS BENTLEY. 1981. A hidden chapter of German eugenics between the two world wars. *Proceedings of the American philosophical society*, vol. 125, no. 5, October
- GLASS BENTLEY. 1985. *Progress or Catastrophe. The nature of biological science and its impact on human society*. New York [etc.]: Praeger
- GLASS BENTLEY. 1986. Geneticists embattled: their stand against rampant eugenics and racism in America during the 1920s and 1930s. *Proceedings of the American philosophical society*, vol. 130, no. 1, 1986
- GLASS, JAMES M. 1997. *Life unworthy of life: racial phobia and mass murder in Hitler's Germany*. New York: Basic Books.
- GLATZER ROSENTHAL, BERNICE (ed.). 1997. *The occult in Russian and Soviet Culture*. Ithaca & London: Cornell University Press
- GLICK, BERNARD R., PASTERNAK, JACK J. 1994. *Molecular biotechnology: fundamentals and applications of recombinant DNA*. Ft. Washington, Pa.: ASM Press.
- GLICK, THOMAS F., PUIG-SAMPER, MIGUEL ANGEL, RUIZ ROSAURA. 1999. *The reception of Darwinism in the Iberian world. Spain, S America and Brazil*. Dordrecht, Boston, London: Kluwer Academic Publishers
- GLIOZZI GIULIANO. 1977. *Adamo e il Nuovo Mondo: la nascita dell'antropologia come ideologia coloniale*. Firenze: la Nuova Italia Editrice.
- GLIOZZI GIULIANO. 1990. *Le teorie della razza nell'età moderna*. Torino: Loescher.
- GOLDBERG ANN. 1999. *Sex, religion, and the making of modern madness. The Eberbach Asylum and German Society, 1815-1849*. New York, O Oxford University Press
- GOLDBERG, DAVID T. (ed.). 1990. *Anatomy of racism*. Minneapolis, London: University of Minnesota Press.
- GOLDBERG, DAVID T. 1993. *Racist culture. Philosophy and the politics of meaning*. Malden Mass.: Blackwell Publishers
- GOLDMAN, STEVEN L. (ed.). 1989. *Science, technology, and social progress*. London and Toronto: Associated University Presses
- GOLUB, EDWARD S. 1994. *The limits of medicine. How science shapes our hope for the cure*. New York: Times Books
- GONZÁLEZ, ARMANDO GARCÍA, PELÁEZ, RAQUEL ÁLVAREZ. 1999. *En busca de la raza perfecta: eugenesia e higiene en Cuba, 1898* Madrid: CSIC
- GOODELL RAE. 1975. *The visible scientist*. Boston, Toronto: Little, Brown and Co.
- GÖTZ ALY, CHROUST PETER, PROSS CHRISTIAN. 1994. *Cleansing the fatherland: Nazi medicine and racial hygiene*. Baltimore: Johns Hopkins University Press.
- GOULD, STEPHEN JAY. 1981. *The Mismeasure of Man*. London [etc.]: Penguin Books
- GRADMANN CHRISTOPH. 2000. Invisible enemies. Bacteriology and the language of politics in Imperial Germany. *Science in Context* 13,1, 2000, pp. 9-30
- GRAHAM, LOREN R. 1977. Science and Values: The Eugenics Movement in Germany and Russia in the 1920s. *The American Historical Review*. Vol. 82, No. 5. pp. 1133-1164.
- GRAHAM, LOREN R. 1981. *Between Science and Values*. New York: Columbia University Press.
- GRAMSCI ANTONIO. 1996a. *Gli intellettuali e l'organizzazione della cultura*. Roma: Editori Riuniti
- GRAMSCI ANTONIO. 1996b. *Lettere dal carcere*. Palermo: Sellerio
- GRANT MADISON. 1926. *Passing of the great race; or, The racial basis of European history*. New York, C. Scribner's sons
- GRATZER WALTER. 2000. *The undergrowth of science. Delusion, self-deception and human frailty*. Oxford, New York: Oxford University Press
- GRAVES, JOSEPH L. Jr. 2001. *The emperor's new clothes. Biological theories of race at the new millennium*. New Brunswick, New Jersey, and London: Rutgers University Press
- GREEN MARTIN. 1986. *Mountain of Truth. The counterculture begins - Ascona, 1900-1920*. Hanover and London: University Press of New England
- GREGORY JANE, MILLER STEVE. 1998. *Science in Public*. New York and London: Plenum Trade.
- GROS FRANÇOIS. 1989. *La civilisation du gène*. Paris: Hachette
- GROSS, PAUL R., LEVITT NORMAN. 1994. *Higher superstition: the academic left and its quarrels with science*. Baltimore, London: Johns Hopkins University Press.

- GUDDING GABRIEL. 1996. The phenotype / genotype distinction and the disappearance of the body. *Journal of the History of Ideas* 57 (3) 525-545
- GUERLAC HENRY. 1975. *Antoine-Laurent Lavoisier. Chemist and revolutionary*. New York: Charles Scribner's Sons
- GUSTIN, BERNARD H. 1973. Charisma, recognition, and the motivation of scientists. *The American Journal of Sociology*. Vol. 78, No. 5 (Mar., 1973), 1119-1134
- GUTTING GARY (ed.). 1994. *The Cambridge companion to Foucault*. Cambridge; New York: Cambridge University Press.
- HABERMAS JÜRGEN. 1968. *Technik und Wissenschaft als Ideologie*. Frankfurt am Main: Suhrkamp.
- HABERMAS JÜRGEN. 1969. *Protestbewegung und Hochschulreform*. Frankfurt am Main: Suhrkamp
- HABERMAS JÜRGEN. 1983. *Moralbewusstsein und kommunikatives Handeln*. Frankfurt am Main: Suhrkamp.
- HABERMAS JÜRGEN. 1985. *Handlungsrationalität und gesellschaftliche Rationalisierung*. Frankfurt am Main: Suhrkamp.
- HABERMAS, JÜRGEN. 1987. *The philosophical discourse of modernity: twelve lectures*. Cambridge, Mass.: MIT Press.
- HABERMAS JÜRGEN. 2001. *Die Zukunft der menschlichen Natur: auf dem Weg zu einer liberalen Eugenik?* Frankfurt am Main: Suhrkamp.
- HAECKEL ERNST. 1910. *The wonders of life*. London: Watts & co.
- HAKFOORT CASPER. 1995. The historiography of scientism: a critical review. *History of Science*. 333: p. 375-395
- HALDANE, JOHN B. S. 1924. *Daedalus or Science and the Future*. New York: E.P. Dutton and Co.
- HALDANE, J.B.S. 1928. *Possible Worlds and other essays*. Chatto & Windus: London
- HALDANE, J.B.S. 1932. *The inequality of man and other essays*. Chatto & Windus: London
- HALE, ORON J. 1971. *The Great Illusion 1900-1914*. New York, Evanston, and London: Harper & Row
- HALL JOHN A. JARVIE I. C. (eds). 1992. *Transition to modernity: essays on power, wealth, and belief* Cambridge; New York: Cambridge University Press.
- HALMOS PAUL (ed.). 1973. *Professionalisation and social change*. Keele: Keele University.
- HANAUSKE-ABEL, HARTMUT M. 1996. Not a Slippery Slope or Sudden Subversion: German Medicine and National Socialism in 1933. *BMJ: British Medical Journal* 313 (7070): 1453-1463.
- HANNAY ALASTAIR, MARINO GORDON D. (eds.). 1998. *The Cambridge companion to Kierkegaard*. Cambridge, New York: Cambridge University Press.
- HARDING SANDRA. 1986. *The Science question in feminism*. Milton Keynes: Open University Press
- HARDING SANDRA (ed.) 1993. *The racial economy of science*. Bloomington: Indiana University Press
- HARPER, PETER S., CLARKE, ANGUS J. 1997. *Genetics, society and clinical practice*. Oxford: Bios scientific publishers Ltd
- HARRINGTON ANNE. 1996. *Reenchanted Science. Holism in German culture from Wilhelm II to Hitler*. Princeton, New Jersey: Princeton University Press
- HARRIS JOHN. 1993. Is gene therapy a form of eugenics? *Bioethics*, 7, 1993
- HARRIS, SHELDON H. 1994. *Factories of Death. Japanese biological warfare 1932-45 and the American cover-up*. London and New York: Routledge
- HARWOOD JONATHAN. 1993. *Styles of scientific thought. The German Genetics community 1900-1933*. Chicago, London: The University of Chicago Press
- HARWOOD JONATHAN. 1996. Weimar culture and biological theory. *History of Science*. 34.
- HASIAN, ARIF MASOUF Jr. 1996. *The Rhetoric of eugenics in Anglo-American thought*. Athens and London: The University of Georgia Press
- HASSENTEUFEL PATRICK. 1997. *Les médecins face à l'État*. Paris: Presses de Sciences Po.
- HATFIELD HENRY. 1952. *Thomas Mann*. London: Peter Owen Limited
- HATS, J.N. 1998. *The burdens of disease. Epidemics and human response in Western History*. New Brunswick [etc]: Rutgers University Press
- HAU MICHAEL. 2003. *The cult of health and beauty in Germany: a social history, 1890-1930*. Chicago and London: University of Chicago Press
- HAWLEY, R. SCOTT, MORI, CATHERINE A. 1999. *The Human Genome. A user's guide*. San Diego [etc.]: Academic Press
- HAYNE, ROBERT H. (ed.) 1976. *Man and the Biological Revolution*. Toronto: York University
- HAYNES, ROSLYNN D. 1994. *From Faust to Strangelove*. Baltimore and London: The Johns Hopkins University Press
- HEARN FRANK. 1985. *Reason and Freedom in Sociological Thought*. Boston: Allen & Unwin.
- HECHT, JENNIFER MICHAEL. 1999. The solvency of metaphysics: the debate over racial science and moral philosophy in France, 1890-1914. *Isis*, vol. 90, No. 1 (Mar., 1999), 1-24
- HEIDEGGER MARTIN. 1977. *The question concerning technology, and other essays*. New York: Harper & Row.
- HEIDEGGER MARTIN. 2000. *Vorträge und Aufsätze*. Frankfurt am Main: V. Klostermann.
- HERF JEFFREY. 1984. *Reactionary Modernism. Technology, culture, and politics in Weimar and the Third Reich*. Cambridge [etc.]: Cambridge University Press
- HENIGHAN TOM (ed.). 1980. *Brave New Universe. Testing the values of science in society*. Ottawa: The Tecumseh Press.
- HERLITZIUS ANETTE. 1995. *Frauenbefreiung und Rassenideologie*. Gabler, Vieweg: Westdeutscher
- HERMAND JOST. 1992. *Old Dream of a New Reich. Volkish Utopias and National socialism*. Bloomington and Indianapolis: Indiana University
- HERMAN ARTHUR. 1997. *The idea of decline in western history*. New York [etc.]: The Free Press
- HERMANN ARMIN. 1982. *Wie die Wissenschaft ihre Unschuld verlor. Macht und Missbrauch der Forscher*. Stuttgart: Deutsche Verlags-Anstalt
- HERMANOWICZ, JOSEPH C. 1998. *The stars are not enough*. Chicago and London: The university of Chicago Press.
- HERZLICH CLAUDINE, PIERRET JANIEEN. 1984. *Malades d'hier, malades d'aujourd'hui: de la morte collective au devoir de guérison*. Paris: Payot.
- HESS, DAVID J. 1997. *Science Studies*. New York and London: New York University Press.
- HILL, A.V. 1952. The ethical dilemmas of science, *Nature*, 170: 1952
- HILTON BRUCE, CALLAHAN DANIEL [etc.] (eds.). 1973. *Ethical issues in human genetics*. New York, London: Plenum Press
- HILTS, VICTOR L. 1982. Obeying the laws of hereditary descent: phrenological views on inheritance and eugenics. *Journal of the history of the behavioural science* 18 (1982): 62-77
- HIRSCH WALTER. 1968. *Scientists in American Society*. New York: Random House

- HOHENDORF GERRIT, MAGULI-SELTENREICH ACHIM. 1990. *Von der Heilkunde zur Massentötung. Medizin im Nationalsozialismus*. Heidelberg: Das Wunderhorn
- HOLGER-MAEHLE ANDREAS, GEYER-KORDESH JOHANNA (eds.). 2002. *Historical and Philosophical Perspectives on Biomedical Ethics*. Burlington (VT): Ashgate.
- HOLTUNG NILS. 1999. Does justice require genetic enhancement? *The New Genetics. Journal of Medical Ethics* [Special Issue] 25(2): 75-214.
- HOLTZMAN, NEIL A. 1989. *Proceed with caution. Predicting genetic risks in the recombinant DNA Era*. Baltimore and London: the Johns Hopkins University Press
- HOMEI AYA. 2000. *Giving birth to a rich nation and strong soldiers: midwives and national building in Japan between Meiji period and the 1940s*. Paper presented at the joint Princeton-Columbia Graduate Student Workshop.
- HONG, YOUNG-SUN. 1998. *Welfare, Modernity, and the Weimar State, 1919-1933*. Princeton, New Jersey: Princeton University Press
- HONNETH AXEL. 1989a. *Kritik der Macht*. Frankfurt am Main: Suhrkamp.
- HONNETH AXEL, MCCARTHY THOMAS, OFFE CLAUS, WELLMER ALBRECHT. 1989b. *Zwischenbetrachtungen im Prozeß der Aufklärung*. Frankfurt am Main: Suhrkamp.
- HOPPER, DAVID H. 1991. *Technology, theology, and the idea of progress*. Louisville, Kentucky: Westminster/John Knox Press
- HORBAN, CORINNA THERESA. 1999. *Gynäkologie und Nationalsozialismus: die Zwangsterilisierten, ehemaligen Patientinnen der I. Universitätsfrauenklinik heute – eine späte Entschuldigung*. München: Herbert Utz Verlag
- HORKHEIMER MAX, ADORNO, THEODORE W. 1984. *Dialektik der Aufklärung*. Frankfurt am Main: Suhrkamp.
- HORKHEIMER MAX. 1991. *Zur Kritik der instrumentellen Vernunft (Gesammelte Schriften Band 6)*. Frankfurt: Fischer.
- HORN, DAVID G. 1994. *Social Bodies. Science, reproduction, and Italian modernity*. Princeton: Princeton University Press.
- HOROWITZ ASHER, MALEY TERRY. 1994. *The Barbarism of reason: Max Weber and the twilight of Enlightenment*. Toronto [etc.]: University of Toronto Press
- HOUSDEN MARTYN. 1997. *Resistance and conformity in the Third Reich*. London and New York, Routledge 1997
- HUBBARD RUTH, WALD ELIJAH. 1997. *Exploding the gene myth*. Boston: Beacon Press
- HUDSON NICHOLAS. 1996. From "nation" to "race": The origin of racial classification in 18th-century thought. *Eighteenth-century studies*, vol. 29, n. 3 pp. 247-264
- HUMBER, JAMES M., ALMEDER, ROBERT F. (eds.). 2000. *Is there a duty to die?* Totowa, New Jersey: Humana Press
- HUXLEY JULIAN. 1947. *Man in the modern world (?)*. London: Chatto & Windos
- HUXLEY JULIAN, sir. 1964. *Essays of a Humanist*. New York and Evanston: Harper & Row
- HYAM RONALD. 1990. *Empire and sexuality. The British Experience*. Manchester and New York: Manchester University Press
- IGGERS, GEORG G. 1965. The Idea of Progress: A Critical Reassessment. *The American Historical Review*. Vol. 71, No. 1. pp. 1-17.
- IPSEN CARL. 1998. Population policy in the age of fascism: observations on recent literature. *Population and development review*, Vol. 24, Issue 3 (Sep., 1998), 579-592
- ISAACS, LEONARD N. 1987. The effecting of all things possible: molecular biology and Bacon's vision. *Perspectives in Biology and Medicine* 30,3 Spring 1987
- JACOBSEN, JOHN KURT. 2000. *Technical Fouls. Democratic Dilemmas and Technological Change*. Boulder (Colorado): Westview Press
- JAGTENBERG TOM. 1983. *The social construction of science*. Dordrecht, Boston, London: D. Reidel Publishing Company.
- JANOVY JOHN, Jr. 1985. *On becoming a biologist*. New York: Harper & Row
- JARVIE, I. C. 1984. *Rationality and relativism: in search of a philosophy and history of anthropology*. London: Routledge & Kegan Paul.
- JONES GRETA. 1982. Eugenics and social policy between the wars. *The historical journal*, 25, 3, (1982), pp. 717-728
- JONES GRETA. 1986. *Social hygiene in twentieth century Britain*. London [...]: Croom Helm
- JOHNSON, JEFFREY A. 1990. *The Kaiser's chemists: science and modernization in Imperial Germany*. Chapel Hill and London: University of North Carolina Press.
- JONES COLIN, PORTER ROY. 1994. *Reassessing Foucault: power, medicine and the body*. London and New York: Routledge.
- JORDAN STARR DAVID. 1910. *The blood of the nation: a study of the decay of races through the survival of the unfit*. Boston: American Unitarian Association
- JORDAN STARR DAVID. 1915 *War and the breed; the relation of war to the downfall of nations*. Boston: The Beacon Press
- JORDANOVA LUDMILLA. 1999. *Nature displayed. Gender, science and medicine 1760-1820*. London & New York: Longman
- JOSEPHSON, PAUL R. 1996. *Totalitarian science and technology*. Atlantic Highlands, N.J.: Humanities Press
- JUNG, CARL G. 1953(a). *The collected works. Psychology and Alchemy*. London: Routledge and Kegan Paul
- JUNG, CARL G. 1953 (b). *The collected works. Alchemical Studies*. London: Routledge and Kegan Paul
- KAISER GERHARD. 1994. *Ist der Mensch zu retten? Vision und Kritik der Moderne in Goethes „Faust“*. Freiburg in Breisgau: Rombach
- KAISER, JOCHEN-CHRISTOPH. NOWAK KURT, SCHWARTZ Michael. 1992. *Eugenik, Sterilisation, "Euthanasie": Politische Biologie in Deutschland 1895-1945*. Berlin: Buchverlag Union.
- KAMEN HENRY. 1997. *The Spanish Inquisition: a historical revision*. New Haven and London: Yale University Press
- KAPLAN, DAVID E., MARSHAL ANDREW. 1996. *The cult at the end of the world*. New York: Crown Publishers, Inc.
- KAPPELER MANFRED. 2000. *Der schreckliche Traum vom Vollkommenen Menschen. Rassenhygiene und Eugenik in der Sozialen Arbeit*. Marburg: Sc Pressverlag
- KASS, LEON R. 1985. *Toward a more natural science. Biology and human affairs*. New York: The Free Press
- KASS, LEON R. 2002. *Life, Liberty and the Defense of Dignity. The Challenge for Bioethics*. San Francisco: Encounter Books
- KATER, MICHAEL H. Hitler's early doctors: Nazi physicians in Predepression Germany. *Journal of Modern History* 59 (March 1987): 25-52.
- KATER, MICHAEL H. 1989. *Doctors under Hitler*. Chapel Hill: University of North Carolina Press.
- KATZ-ROTHMAN BARBARA. 1998. *Genetic maps and human imaginations. The limits of science in understanding who we are*. New York and London: W.W. Norton & Company
- KAUPEN-HAAS HEIDRUN, SALLER CHRISTIAN (Eds.). 1999. *Wissenschaftlicher Rassismus. Analysen einer Kontinuität in den Human- und Naturwissenschaften*. Frankfurt am Main, New York: Campus
- KAWAKITA YOSIO et al. (eds.). 1993. *History of epidemiology. Proceedings of the 13th international symposium on the comparative history of medicine – East and West*. Tokyo: Ishiyaku EuroAmerica Inc.

- KAYE, HOWARD L.. 1986. *The social meaning of modern biology. From social Darwinism to socio-biology*. New Haven and London: Yale University Press
- KELLER CHRISTOPH. 2003. *Building Bodies. Der Mensch im biotechnischen Zeitalter. Reportagen und Essays*. Zürich: Limmat Verlag
- KELLY ALFRED. 1981. *The descent of Darwin. The popularisation of Darwinism in Germany, 1860-1914*. Chapel Hill: University of North Carolina
- KERR ANNE, CUNNINGHAM-BURLEY SARAH, AMOS AMANDA. 1998. Eugenics and the new genetics in Britain: examining contemporary professionals' accounts. *Science, Technology & Human Values*, volume 23, issue 2 (Spring 1998), 175-198
- KERR ANNE, SHAKESPEARE TOM. 2002. *Genetic politics. From eugenics to genome*. Greeton Cheltenham: New Clarion Press
- KEVLES, DANIEL J. 1980. Genetics in the United States and Great Britain, 1890-1930: a review with speculations. *ISIS*, 1980, 71 (No. 258) 441-455
- KEVLES, DANIEL J. 1985. *In the name of eugenics*. New York: Alfred A. Knopf,
- KEVLES, DANIEL J., HOOD LEROY (eds.). 1992. *The Code of Codes*. Cambridge Massachusetts, London England: Harvard University Press.
- KIERKEGAARD SØREN. 1941. *Concluding unscientific postscript*. Princeton: Princeton University Press for American-Scandinavian Foundation
- KIMBRELL ANDREW. 1997. *The human body shop: the cloning engineering and marketing of life*. Washington: Regnery
- KING DAVID. 1998. Eugenic Tendencies in Modern Genetics. *Ethics and Medicine* 14.3, 84-89
- KINGSLAND SHARON. 1988. Evolution and Debates Over Human Progress from Darwin to Sociobiology. *Population and Development Review*. Vol. 14, Supplement: *Population and Resources in Western Intellectual Traditions*. pp. 167-198.
- Kitayama, S & Markus H.R.. 1994. *Emotion and culture: Empirical studies of mutual influence*, Washington D.C.: American Psychological Association
- KITCHER PHILIP. 1992. The Naturalists Return. *The Philosophical Review*. Vol. 101, No. 1, *Philosophy in Review: Essays on Contemporary Philosophy*. pp. 53-114.
- KITCHER PHILIP. 2003. *In Mendel's mirror. Philosophical reflections on biology*. Oxford [etc.]: Oxford University Press
- KLAUSEN SUSANNE. 1997. "For the sake of the race": eugenics discourse of feeble-mindedness and motherhood in the South African Medical Record, 1903-1926. *Journal of Southern African Studies*, Vol. 23, No.1 (Mar 1997), 27-50
- KLAW SPENCER. 1968. *The New Brahmins. Scientific Life in America*. New York: William Morrow & Company INC.
- KLEE ERNST. 2001. *Deutsche Medizin im Dritten Reich*. Frankfurt am Main: S. Fischer Verlag
- KLEIN GEORGE. 1994. *The Atheist and the Holy City: Encounters and Reflections*. Cambridge Mass., London, England: The MIT Press
- KLINE WENDY. 2001. *Building a better race. Gender, Sexuality, and Eugenics from the turn of the century to the baby boom*. Berkeley [etc.]: University of California Press
- KNELMAN, FRED H. 1971. *1984 and all that. Modern Science, Social Change, and Human Values*. Belmont (Ca): Wadsworth Publishing Company
- KNIGGE-TESCHE RENATE (ed.). 1999. *Berater der braunen Macht. Wissenschaft und Wissenschaftler im NS-Staat*. Frankfurt am Main: Anabas-Verlag
- KOCH, EGDMONT R., KEBLER WOLFGANG. 1974. *Am Ende ein neuer Mensch? Medizinische Forschung im Zwielficht*. Stuttgart: Deutsche Verlags-Anstalt
- KOCH LENE. The ethos of science. Relations between Danish and German geneticists around World War II. *Scandinavian Journal of History* (September 2002) 27:167-174
- KOCH TOM. 2000. Life quality vs the 'quality of life': assumptions underlying prospective quality of life instruments in health care planning. *Social Science & Medicine*. Vol. 51, Issue 3, 1 August 2000, pp. 418-427
- KOHLBERG LAWRENCE. 1981. *The philosophy of moral development: moral stages and the idea of justice*. San Francisco; London: Harper & Row
- KOLLOQUIEN DES INSTITUTS FÜR ZEITGESCHICHTE (K.U.Z). 1988. *Medizin im Nationalsozialismus*. München: R. Oldenbourg Verlag
- KORNHAUSER WILLIAM. 1962. *Scientists in Industry: conflict and accommodation*, Berkeley: University of California Press.
- KOVEL J. 1988. *White racism: a psychohistory*. London: Free Association Books
- KOZAKAI TOSHIKI. 1991. *Les Japonais sont-ils des occidentaux?* Paris: L'Harmattan
- KOTTEK, SAMUEL S., GARCIA-BALLESTER LUIS. 1996. *Medicine and medical ethics in medieval and early modern Spain*. Jerusalem: The Magnes Press
- KOVEL JOEL. 1984. *White racism: a psychohistory*. New York: Columbia University Press, 1984.
- KOWALIK, JILL ANNE. 1985. „Sympathy with Death“: Hans Castorp's Nietzschean Resentment. *The German Quarterly*, Vol. 58, No. 1 (Winter, 1985), 27-48
- KUBLI ERIC, REICHARDT ANNA KATHARINA (eds.). 2001. *Die Perfektionierung des Menschen*. Bern [etc.]: Peter Lang
- KUDLIEN FRIDOLF. The belief in race and the fight against hereditary diseases and defects. *Hist. Phil. Life Sci.*, 12 (1990), 271-275
- KÜHL STEFAN. 1994. *The Nazi connection. Eugenics, American racism and German National Socialism*. Oxford, New York: Oxford University Press.
- KÜHL STEFAN. 1997. *Die International der Rassisten*. Frankfurt, New York: Campus Verlag.
- KURTZ, PAUL (ed.). *The humanist alternative: some definitions of humanism*. London: Pemberton [etc.], 1973.
- KUZNICK, PETER J. 1987. Beyond the laboratory. Scientists as political activists in 1930s America. Chicago and London: The university of Chicago Press
- LA BERGE, ANN F. 1992. *Mission and method. The early nineteenth-century French public health movement*. Cambridge [etc.]: Cambridge University Press
- LABISCH ALFONS. 1992. *Homo Hygienicus. Gesundheit und Medizin in der Neuzeit*. Frankfurt, New York: Campus
- LACQUER, WALTER Z. 1962. *Young Germany. A history of the German Youth movement*. New York: Basic Books
- LAGNADO, LUCETTE MATALON, DEKEL, SHEILA COHN. 1991. *Children of the flames. Dr. Josef Mengele and the Untold Story of the Twins of Auschwitz*. New York: Morrow
- LAPPE MARC. 1979. *Genetic politics. The limits of biological control*. New York: Simon and Schuster
- LARY N.M. 1973. *Dostoevsky and Dickens. A study of literary influence*. London and Boston: Routledge and Kegan
- LASH SCOTT, FRIEDMAN JONATHAN (Eds.). 1992. *Modernity and Identity*. UK & Cambridge USA Blackwell, Oxford

- LATOUR BRUNO, WOOLGAR STEVE. 1986. *Laboratory Life: The Construction of Scientific Facts*. Princeton: Princeton University Press.
- LATOUR BRUNO. 1987. *Science in Action*, Cambridge, Mass.: Harvard University Press.
- LATOUR BRUNO. 1988. *The Pasteurization of France*. Cambridge, Mass.: Harvard University Press.
- LA VERGATA ANTONELLO. 1990a. Nonostante Malthus. Fecondità, popolazioni e armonia della natura, 1700-1900. Torino: Bollati Boringhieri
- LA VERGATA ANTONELLO. 1990b. *L'equilibrio e la guerra della natura: dalla teologia naturale al darwinismo*. Napoli: Morano editore
- LAVOIE LAURENT (ed.). 2001. *Utopia. De quelques utopies actuelles à l'aube du 3^e millénaire*. Québec: Les Presses de l'université Laval
- LEA, HENRY C. 1983. *Historia de la inquisición española*. Madrid: Fundación Universidad Española
- LEDLEY, FRED D. 1994. Distinguishing Genetics and Eugenics on the Basis of Fairness. *Journal of Medical Ethics* 20(3).
- LEE SILVER. 1998. *Remaking Eden: cloning and beyond in a brave new world*. New York: Avon
- LEE W.R., ROSENHAFT EVE (eds.). 1990. *The State and Social Change in Germany, 1880-1980*. New York, Oxford, Munich: Berg
- LEFFEL JIM. 1997. Defining Humanity in a Postmodern Age. *Ethics and Medicine*; 13.3
- LEFKOWITZ MONROE, BLAKE ROBERT R., MOUTON JANE S. 1955. Status factors in Pedestrian Violation of traffic signals. *Journal of abnormal and social psychology*, 51, 704-706.
- LEM STANISLAW. 1970. *Solaris*. New York: Walker
- LENK HANS. 1992. *Zwischen Wissenschaft und Ethik*. Frankfurt am Main: Suhrkamp
- LÉONARD JACQUES. 1992. *Médecins, malades et société dans la France du XIX^e siècle*. Paris: Sciences en situation
- LERNER, RICHARD M. 1992. *Final Solutions*, University Park: The Pennsylvania State University Press.
- LEVI PRIMO. 1975. *Il sistema periodico*. Torino: Einaudi.
- LEVI PRIMO. 1986. *I sommersi e i salvati*. Torino: Einaudi.
- LEVI PRIMO. 1989. *Se questo è un uomo - La tregua*, Torino: Einaudi.
- LEWONTIN, RICHARD C. 1982. *Human diversity*. New York: Scientific American Library.
- LEWONTIN, RICHARD C. 2001. *It ain't necessarily so*, New York. New York review book.
- LIFTON, ROBERT JAY. 1986. *The Nazi doctors: medical killing and the psychology of genocide*. New York: Basic Books.
- LIFTON ROBERT JAY. 1999. *Destroying the world to save it: Aum Shinrikyo, apocalyptic violence, and the new global terrorism*. New York: Henry Holt & Co.
- LILIENTHAL GEORG. 1979. Rassenhygiene im Dritten Reich. Krise und Wende. *Medizinhistorisches Journal* 14: 114-134
- LILLARD ANGELINE. 1998. Ethnopsychologies: cultural variations in theories of mind. *Psychological Bulletin*, 1998 (123).
- LINDEMANN THOMAS. 2001. *Le doctrines darviniennes et la guerre de 1914*. Paris: Economica
- LINK GUNTHER. 1999. *Eugenische Zwangssterilisationen und Schwangerschaftsabbrüche im Nationalsozialismus*. Frankfurt, etc.: Peter Lang
- LIPPMAN ABBY. 1991. Prenatal genetic testing and screening: constructing needs and reinforcing inequalities. *American Journal of Law and Medicine* XVII, 15-50
- LIPPMAN A. 1992. Led (astray) by genetic maps: the cartography of the human genome and health care. *Soc. Sci. Med.* Vol. 35, No. 12, pp. 1469-1476
- LLOBERA, JOSEP R. 2003. *The making of totalitarian thought*. Oxford, New York: Berg
- LOMBARDO GIOVANNI P., DUICHIN MARCO (Eds.). 1997. *Frenologia, fisionomica e psicologia delle differenze individuali in Franz Joseph Gall. Antecedenti storici e sviluppi disciplinari*. Torino: Bollati Boringhieri
- LONGHI, MARIA VITTORIA. 1997. *Scienziati e responsabilità sociale*. Napoli: Edizioni scientifiche italiane.
- LOVEJOY, ARTHUR O. 1936. *The Chain of Being. A study of the history of an idea*. Cambridge, Mass.: Harvard university press
- LOVEJOY, ARTHUR O. 1960. *Essays in the history of ideas*. New York: Capricorn books
- LOWOOD, HENRY E. 1991. *Patriotism, Profit, and the promotion of science in the German Enlightenment*. Garland Publishing: New York & London
- LUDMERER, KENNETH M. 1972. *Genetics and American Society, an historical appraisal*. Baltimore and London: Johns Hopkins University Press
- LUJAN, JOSE LUIS, MARTINEZ FEDERICO, MORENO LUIS. 1996. *La biotecnología y los expertos*. Madrid: CEPI.
- LURIA SALVADOR. 1984. *A slot machine, a broken test tube. An autobiography*. Harper and Row: New York
- LYGRE, DAVID G. 1979. *Life manipulation. From test-tube babies to aging*. New York: Walker & Co.
- LYNN RICHARD. 2001. *Eugenics. A reassessment*. Westport, Connecticut, London: Praeger
- LYNN-STEINBERG DEBORAH. 1997. *Bodies in glass. Genetics, eugenics, embryo ethics*. Manchester University Press: Manchester University Press
- LYONS SHERRIE. 1998. Science or pseudo-science: phrenology as a cautionary tale for evolutionary psychology. *Perspectives in Biology and Medicine* 41,4 Summer 1998
- LYOTARD, JEAN-FRANÇOIS. 1976. *La condition postmoderne: rapport sur le savoir*. Paris: Éditions de Minuit.
- MAASEN SABINE, WINTERHAGER MATTHIAS (eds.). 2001. *Science Studies. Probing the dynamics of scientific knowledge*. Bielefeld: Transcript Verlag.
- MACINTYRE SALLY. 1997. Social and psychological issues associated with the new genetics. *Philosophical Transactions: Biological Sciences*, Vol. 352, No. 1357, Human Genetics: Uncertainties and the financial implications ahead (Aug. 29, 1997), 1095-1101
- MACLEAN ANNE. 1993. *The elimination of morality. Reflections on utilitarianism and bioethics*. London & New York: Routledge
- MACMASTER NEIL. 2001. *Racism in Europe 1870-2000*. New York: Palgrave
- MAGUBANE, BERNARD M. 1996. *The making of a racist state. British imperialism and the Union of South Africa, 1875-1910*. Trenton, NJ, Asmara, Eritrea: Africa World Press
- MAHONEY, MICHAEL J. 1979. Psychology of the scientists: an evaluative review. *Social Studies of Science*, Vol. 9, No. 3 (Aug., 1979), 349-375
- MAIENSCHIN JANE, RUSE MICHAEL (eds.). 1999. *Biology and the foundation of ethics* edited by. Cambridge: Cambridge University Press.
- MAIOCCHI ROBERTO. 1999. *Scienza italiana e razzismo fascista*. Firenze: La Nuova Italia
- MAJUMDER, PARTHA P. 1993. *Human population genetics. A centennial tribute to J. B. S. Haldane*. New York and London: Plenum Press
- MAKARIUS LAURA. 1969. Le mythe du « Trickster ». *Revue de l'histoire des religions* 175 (1969): 17-46

- MAKOWSKI, CHRISTINE C. 1996. *Eugenik, Sterilisationspolitik, „Euthanasie“ und Bevölkerungspolitik in der nationalsozialistische Parteipresse*. Husum: Matthiesen.
- MALTHUS, THOMAS R. 1992. *An essay on the principle of population*. Cambridge: Cambridge University Press.
- MANN GUNTER, WINAU ROLF (eds.). 1977. *Medizin, Naturwissenschaft, Technik und das Zweite Kaiserreich*. Göttingen: Vandenhoeck & Ruprecht.
- MANN THOMAS. 1995. *The magic mountain*. New York: A. Knopf
- MARANTO GINA. 1996. *Quest for perfection: the drive to breed better human beings*. New York: Lisa Drew Book / Scribner
- MARCUSE, HERBERT. 1998. *Technology, war and fascism*. London; New York: Routledge
- MARGALIT AVISHAI, MOTZKIN GABRIEL. 1996. The Uniqueness of the Holocaust. *Philosophy and Public Affairs*. Vol. 25, No. 1, pp. 65-83.
- MARKEL HOWARD. 1997. *Quarantine! East European Jewish Immigrants and the New York City Epidemics of 1892*. Baltimore and London: The Johns Hopkins University Press
- MARKUSEN ERIK, KOPF DAVID. 1995. *The Holocaust and strategic bombing. Genocide and total war in the twentieth century*. Boulder [etc.]: Westview Press
- MARSAK, LEONARD M. (ed.). 1964. *The rise of science in relation to society*. New York: The MacMillan Company
- MARTIN BRIAN. 1980. The goal of self-managed science: implications for action. *Radical Science Journal*, No. 10, pp. 3-17.
- MARTIN EMILY. 1996. Meeting Polemics with Irenics in the science wars. *Social Text*, No. 46/47, Science Wars (Spring – Summer 1996), 43-60
- MARTIN, JOHN LEVI. 1996. Structuring the sexual revolution. *Theory and Society*, vol. 25, No. 1 (Feb. 1996), 105-151
- MARTINEZ, DOLORES P. 1998. *The worlds of Japanese popular culture*. Cambridge: Cambridge University Press, Cambridge.
- MARUYAMA MASAO. 1969. *Thought and behaviour in modern Japanese politics*. London, New York, Oxford University Press
- MASSIN BENOÎT. 1990. Le Nazisme et la science. *La recherche* 227 decembre 1990 vol. 21 : 1562-1575
- MATTIOLI ARAM (ed.). 1995. *Intellektuelle von rechts: Ideologie und Politik in der Schweiz 1918-1939*. Zürich: Orell Füssli
- MAYLAM PAUL. 2001. *South Africa's racial past. The history and historiography of racism, segregation and apartheid*. Aldershot [etc.]: Ashgate
- MAYOR FEDERICO, FORT AUGUSTO. 1995. *Science and Power*. Paris : UNESCO publishing
- MAYLAM PAUL. 2001. *South Africa's racial past. The history and historiography of racism, segregation, and apartheid*. Aldershot [etc.]: Ashgate
- MAYR ERNST. 1982. *The growth of biological thought. Diversity, evolution, inheritance*. Cambridge, Mass., London, England: The Belknap Press of Harvard University Press
- MAYR ERNST. 1997. *This is biology. The science of the living world*. Cambridge, Mass., London, England: The Belknap Press of Harvard University Press
- MAZUMDAR, PAULINE M.H. 1990. Blood and soil: the serology of the Aryan racial state. *Bull. Hist. Med.*, 1990, 64:187-219
- MAZUMDAR PAULINE M.H. 1992 *Eugenics, Human Genetics and Human Failings: The Eugenics Society, its Sources and its Critics in Britain* London: Routledge
- MAZZOLINI, RENATO G. 1988. *Politisch-biologische Analogien im Frühwerk Rudolf Virchows*. Marburg: Basiliken-Presse
- MCCARTHY VEACH PATRICIA BARTELS DIANNE M. LEROY BONNIE S. 2002. Commentary on genetic counseling – A profession in search of itself. *Journal of Genetic Counseling*, Vol. 11, No. 3, June 2002: 187-191
- MCCONKIE-ROSELL ALLYN, SULLIVAN JENNIFER A. 1999. Genetic counseling – stress, coping, and the empowerment perspective. *Journal of Genetic Counseling*, Vol. 8, No. 6, 1999: 345-357
- McINTOSH CHRISTOPHER. 1992. *The Rose Cross and the age of reason*. Leiden, New York, Köln: E.J.Brill
- McKNIGHT, STEPHEN A. (ed.). 1992. *Science, pseudo-science, and utopianism in early modern thought*. Columbia and London: University of Missouri Press
- McLAREN ANGUS. 1974. Phrenology: Medium and Message. *The Journal of Modern History*, Vol. 46, No. 1 (Mar., 1974), 86-97
- McLAREN ANGUS. 1981. A prehistory of the Social Sciences: Phrenology in France. *Comparative Studies in Society and History*, Vol. 23, No. 1 (Jan., 1981), 3-22
- McLAREN ANGUS. 1986. The creation of a Haven for Human Thoroughbreds: the sterilization of the feeble-minded and the mentally ill in British Columbia. *Canadian Historical Review*, LXVII, 2, 1986
- McLAREN ANGUS. 1990. *Our own master race: Eugenics in Canada 1885-1945*. Toronto [etc.]: Oxford University Press
- McLAREN ANGUS. 1992. Sex radicalism in the Canadian Pacific Northwest. *Journal of the History of Sexuality*, vol. 2, no. 4
- McMAHON DARRIN M. 2001. *Enemies of the Enlightenment and the Making of Modernity*. New York: Oxford University Press.
- McPHAIL, MARK LAWRENCE. 2002. *The Rhetoric of Racism revisited. Reparations or Separations?* Lanham: Rowman & Littlefield
- MEDAWAR, P.B., MEDAWAR, J.S. 1977. *The Life Sciences. Current ideas of biology*. London: Wildwood House
- MEDAWAR, PETER BRIAN, Sir. 1979. *Advice to a young scientist*. New York: Harper & Row.
- MEDAWAR PETER. 1986. *Memoirs of a thinking radish. An autobiography*. Oxford, New York: Oxford University Press
- MEDAWAR PETER. 1990. *The Threat and the Glory. Reflections on science and scientists*. Oxford [...]: Oxford University Press.
- MEUSS, W.H.J. & RAAIJMAKERS, Q.A. 1986. Administrative Obedience: Carrying out orders to use Psychological-Administrative Violence. *European Journal of Social Psychology*, 16, 311-324.
- MELZER, ARTHUR M. 1996. *The Origin of the Counter-Enlightenment: Rousseau and the New Religion of Sincerity*. The American Political Science Review. Vol. 90, No. 2, pp. 344-360
- MENDELSON EVERETT, WEINGART PETER, WHITLEY RICHARD (eds.). 1977. *The social production of scientific knowledge*. Dordrecht, Boston: D. Reidel Publishing Company.
- MENDELSON EVERETT, ELKANA YEHUDA. 1981. *Sciences and cultures*. Dordrecht, Boston, London: D. Reidel Publishing Company.
- MENDELSON EVERETT (ed.). 1984. *Transformation and tradition in the sciences*. Cambridge: Cambridge University Press
- MENDELSON EVERETT, NOWOTNY HELGA (eds.). 1984. *Nineteen Eighty-Four: science between utopia and dystopia*. Dordrecht, Boston, London, Lancaster: D. Reidel Publishing Company.
- MEINEL CHRISTOPH, VOSWINCKEL PETER (eds.). 1994. *Medizin, Naturwissenschaft, Technik und Nationalsozialismus*. Stuttgart: GNT.
- MERTON, ROBERT K. 1973. *The sociology of science: theoretical and empirical investigations*. Chicago: University of Chicago Press
- METRAUX DANIEL. 2000. *Ann Shinrikyo's impact on Japanese society*. Lewiston [etc.]: Edwin Mellen Press
- MEYNAUD JEAN, SCHRÖDER BRIGITTE. 1962. *Les savants dans la vie internationale*. Lausanne: Ecole de science politique.

- MICHAEL JOHN. 2000. *Anxious intellectuals. Academic professionals, public intellectuals, and enlightenment values*. Durham and London: Duke University Press
- MICKLOS DAVID, CARLSON ELOF. 2000. Engineering American society: the lesson of eugenics. *Nature Reviews Genetics* 1, 153-158
- MIDGLEY MARY. 1985. *Evolution as a religion. Strange hopes and strange fears*. London and New York: Methuen
- MIDGLEY MARY. 1989. *Wisdom, information, and wonder. What is knowledge for?* London and New York: Routledge
- MIDGLEY MARY. 1992. *Science as Salvation*. London and New York: Routledge
- MIDGLEY MARY. 1996. *Utopias, dolphins and computers. Problems of philosophical plumbing*. London and New York: Routledge
- MIDGLEY MARY. 1998. The ethical primate: humans, freedom and morality. London and New York: Routledge
- MIETH DIETMAR, POHIER JACQUES (eds.). 1989. *Ethics in the natural sciences*. Edinburgh: T. & T. Clark.
- MILDT, DICK DE. 1996. *In the name of the people: perpetrators of genocide in the reflection of their post-war prosecution in West Germany: the 'Euthanasia' and 'Aktion Reinhard' trial cases*. The Hague: Martinus Nijhoff.
- MILGRAM STANLEY. 1974a. The perils of Obedience. *Harper's magazine* (online).
- MILGRAM STANLEY. 1974b. *Obedience to authority: an experimental view*. London: Tavistock Publications.
- MILLER, HENRY I. 1997. *Policy controversy in biotechnology: an insider's view*. Austin: R.G. Landes Co.
- MILLS, C. WRIGHT. 1970. *The sociological imagination*. Harmondsworth: Penguin.
- MISSA, JEAN-NOËL, SUSANNE CHARLES (eds.). 1999. *De l'eugénisme d'État à l'eugénisme privé*. Paris, Bruxelles: De Boeck & Larcier
- MITROFF, IAN I. 1974. Norms and Counter-Norms in a select group of the Apollo Moon scientists: a case study of the ambivalence of scientists. *American sociological review*, Vol. 39, No. 4 (Aug., 1974), 579-595
- MITZMAN ARTHUR. 1970. *The iron cage: an historical interpretation of Max Weber*. New York: Alfred A. Knopf
- MOCEK REINHARD. 2002. *Biologie und soziale Befreiung. Zur Geschichte des Biologismus und der Rassenhygiene in der Arbeiterbewegung*. Frankfurt am Main [etc.]: Peter Lang
- MOCHI ALBERTO. 1943. *Perché l'uomo è uno sconosciuto?* Siena: Ticci.
- MONGARDINI CARLO (ed.). 1991. *Due dimensioni della società: l'utile e la morale*. Roma: Bulzoni Editore
- MOORE, JAMES R. (ed.). 1989. *History, humanity and evolution*. Cambridge [etc.]: Cambridge University Press
- MOORE KELLY. 1996. Organizing Integrity: American Science and the Creation of Public Interest Organizations, 1955-1975. *The American Journal of Sociology*, Vol. 101, No. 6 (May, 1996), 1592-1627
- MORENO, JONATHAN D. 2000. *Undue Risk. Secret state experiments on humans*. New York: W. H. Freeman & Company
- MOROT EDOUARD. 1961. Sartre's Critique of Dialectical Reason. *Journal of the History of Ideas*.
- MORRIS BRIAN. 1985. The Rise and Fall of the Human Subject. *Man, New Series*, Vol. 20, No. 4. (Dec., 1985): pp. 722-742
- MORRIS-SUZUKI, TESSA. 1994. *The technological transformation of Japan*. Cambridge, New York, Melbourne: Cambridge University Press.
- MOSSE, GEORGE L. 1964. *The crisis of German ideology. Intellectual origins of the Third Reich*. New York: Grosset & Dunlap
- MOSSE, ROGER. 1978. *Towards the Final Solution. A history of European Racism*. New York: Howard Fertig
- MOSSE, GEORGE L. 1982. Nationalism and respectability: normal and abnormal sexuality in the Nineteenth century. *Journal of contemporary history*, Vol. 17, No. 2, Sexuality in History (Apr., 1982), 221-246
- MOSSE, GEORGE L. 1988. *The Culture of Western Europe. The Nineteenth and Twentieth Centuries*. Boulder and London: Westview Press
- MOSSE ROGER. 1978. *Towards the Final Solution. A history of European Racism*. New York: Howard Fertig
- MULKAY MICHAEL. 1980. *Science and the sociology of knowledge*. London: George Allen & Unwin.
- MULKAY MICHAEL, VOIJIN MILIK. 1980. *The sociology of Science in East and West*. London: Sage
- MULKAY MICHAEL. 1991. *Sociology of science: a sociological pilgrimage*. Buckingham: Open University Press.
- MULLER, H.J. 1935. *Out of the night. A biologist's view of the future*. New York: The Vanguard Press
- MULLER, JESSICA H. 1994. Anthropology, bioethics, and medicine: a provocative trilogy. *Medical Anthropology Quarterly*, New Series, Vol. 8, No. 4, Conceptual Development in Medical Anthropology: a tribute to M. Margaret Clark (Dec., 1994), 448-467
- MÜLLER-HILL BENNO. 1981. *Die Philosophen und das Lebendige*. Frankfurt / New York: Campus Verlag
- MÜLLER-HILL, BENNO. 1988. *Murderous science: elimination by scientific selection of Jews, Gypsies, and others, Germany 1933-1945*, Oxford [Oxfordshire] New York: Oxford University Press.
- MÜLLER-HILL BENNO. 1993. Science, truth, and other values. *The Quarterly Review of Biology*, 68, 3 September 1993
- MUMFORD LEWIS. 1970. *The Pentagon of Power. The Myth of the Machine*. New York: Harcourt Brace Jovanovich
- MUMFORD LEWIS. 1997. *Storia dell'Utopia*. Roma: Donzelli.
- MUSIL ROBERT. 1979. *The man without qualities*. London: Secker & Warburg
- NADAV, DANIEL S. 1985. *Julius Moses (1868-1942) und die Politik der Sozialhygiene in Deutschland*. Gerlingen: Bleicher
- NADER LAURA (ed.). 1996. *Naked science: anthropological inquiry into boundaries, power, and knowledge*. New York London: Routledge.
- NADER LAURA. 1997. Controlling Processes: Tracing the Dynamic Components of Power. *Current Anthropology*. 5:711-737.
- NAPIER, SUSAN J. 1993. Panic sites: the Japanese imagination of disaster from Godzilla to Akira. *Journal of Japanese Studies*, Vol. 19, No. 2 (Summer, 1993), 327-351
- NATHAN-OLFF, JOSIANE (ed.). 1993. *La science sous le troisième Reich*. Paris: Seuil
- NEEDHAM JOSEPH. 1948. *Time: the refreshing river (essays and addresses, 1932-1942)*. London: George Allen & Unwin
- NEEDHAM JOSEPH. 1954-2000. *Science and Civilisation in China*. Cambridge: Cambridge University Press.
- NEEDHAM JOSEPH. 1969. *The grand titration: science and society in East and West*. London: Allen & Unwin.
- NEEL, JAMES V. 1991. Priorities in the application of genetic principles to the human condition: a dissident view. *Perspectives in Biology and Medicine* 35,1 Autumn 1991
- NEEL, JAMES V. 1994. *Physician to the Gene Pool. Genetic lessons and other stories*. New York [etc.]: John Wiley & Sons
- NELKIN DOROTHY (ed.). 1992. *Controversy: Politics of technical decisions*. Newbury Park, London: Sage.
- NELKIN DOROTHY & LINDEE, S. M. 1995a. *The DNA mystique: the gene as cultural icon*. New York: Freeman.
- NELKIN DOROTHY. 1995b. *Selling science: how the press covers science and technology*, New York: W. H. Freeman.
- NELSON, J. ROBERT. 1980. *Science and our troubled conscience*. Philadelphia: Fortress Press
- NEUHAUS, RICHARD JOHN. 1999. The Idea of Moral Progress. *First Things*, 95: 21-27.

- NEULOH OTTO, ZILIUS WILHELM. 1982. *Die Wandervögel. Eine empirische-soziologische Untersuchung der frühen deutschen Jugendbewegung*. Göttingen: Vandenhoeck & Ruprecht
- NEUMANN MARGHERITE (ed.). 1978. *The tricentennial people. Human application of the new genetics*. Ames, Iowa: Iowa State University Press
- NEWMAN, JAMES R. (ed.). 1961. *What is science?* New York: Washington square press.
- NIEBUHR REINHOLD. 1941. *The nature and destiny of man: a Christian interpretation*. London: Nisbet.
- NIETZSCHE FRIEDRICH. 1968. *The Will to Power*. New York: Vintage Books
- NIETZSCHE FRIEDRICH. 1969. *Thus spoke Zarathustra: a book for everyone and no one*. Harmondsworth: Penguin
- NIETZSCHE FRIEDRICH. 1974. *The gay science*. New York: Vintage Books.
- NIETZSCHE FRIEDRICH. 1996. *Human all too human*. Lincoln: University of Nebraska
- NISBET ROBERT. 1980. *History of the idea of progress*. London: Heinemann
- NITSCHKE ASMUS. 1999. *Die "Erbpolizei" im Nationalsozialismus. Zur Alltagsgeschichte der Gesundheitsämter im Dritten Reich*. Opladen, Wiesbaden: Das Beispiel Bremen.
- NOBLE, DAVID F. 1999. *The religion of technology. The divinity of man and the spirit of invention*. Harmondsworth: Penguin Books
- NOLL STEVEN. 1995. *Feeble-minded in our midst. Institutions for the mentally retarded in the South, 1900-1940*. Chapel Hill and London: the University of North Carolina Press.
- NORRIS ANDREW. 2000. Giorgio Agamben and the politics of the living dead. *Diacritics* (30.4): 38-58
- NOSSAL, G. J. V. 1975. *Medical science and human goals*. London: Edward Arnold
- NOSSAL G.J.V., COPPEL, ROSS L. 1989. *Reshaping Life. Key issues in genetic engineering*. Cambridge [etc.]: Cambridge University Press
- NOWOTNY HELGA, TASCHWER KLAUS (eds.). 1996. *The sociology of sciences*. Cheltenham: Edward Elgar.
- O'BRIEN, GERALD VINCENT. 1999. Protecting the social body: use of the organism metaphor in fighting the "menace of the feeble-mit *Mental Retardation*. Vol. 37, No. 3, June 1999
- OLSON RICHARD. 1982-1990. *Science deified & science defied*. Berkeley [etc.]: University of California Press
- O'MALLEY MICHAEL, PAINTER, NELL IRVIN. 1994. Specie and Species: Race and the Money Question in Nineteenth-Century American. *American historical review* 99: 369-395
- O'MURCHU DIARMUID. 1997. *Quantum theology*. New York: Crossroad Publishing Co.
- ORAM GERARD. 1998. *Worthless men. Race, eugenics and the death penalty in the British Army during the First World War*. London: Francis Boutle Publishers
- OSBORN FREDERICK. 1937. Development of a eugenic philosophy. *American Sociological Review*. 389-397
- OSBORN FREDERICK. 1951. *Preface to Eugenics*. New York: Harper & Brothers
- OSTHEIMER, NANCY C., OSTHEIMER JOHN M. 1976. *Life or Death - who controls?* New York: Springer Publishing Company.
- OTSUBO SUMIKO, BARTHOLOMEW JIM. 1998. Eugenics in Japan: Some Ironies of Modernity, 1883- 1945. *Science in Context* 11, 3-4, pp. 545-565.
- OUTHWAITE WILLIAM (ed.). 1996. *The Habermas Reader*. Oxford: Polity.
- OUTRAM DORINDA. 1997. *L'Iluminismo*. Bologna. Il Mulino
- OWEN DAVID. 1994. *Maturity and Modernity. Nietzsche, Weber, Foucault and the ambivalence of reason*. London and New York: Routledge
- PACEY ARNOLD. 1974. *The maze of ingenuity. Ideas and idealism in the development of technology*. London: Allen Lane
- PASSERIN D'ENTRÈVES, MAURIZIO. 1996. Critique and Enlightenment. Michel Foucault on "Was ist Aufklärung?" *Working Paper 118*, University of Manchester.
- PARRINDER PATRICK, ROLFE CHRISTOPHER (Eds.). 1990. *H.G. Wells under revision*. Selinsgrove: Susquehanna University Press, London and Toronto: Associated University Press.
- PARRINDER PATRICK. 1995. *Shadows of the Future. H. G. Wells, Science Fiction and Prophecy*. Liverpool: Liverpool University Press
- PATTERSON CHARLES. 2002. *Eternal Treblinka. Our treatment of animals and the Holocaust*. New York: Lantern Books.
- PAUL DIANE, B. 1984. Eugenics and the Left. *Journal of the History of Ideas*. Vol. 45, No. 4. pp. 567-590
- PAUL DIANE, B. 1995. *Controlling human heredity: 1865 to the present*. Atlantic Highlands, N.J.: Humanities Press.
- PAUL, DIANE B. 1998. *The politics of heredity. Essays on eugenics, biomedicine and the nature-nurture debate*. Albany: State University of New York Press
- PAULY, PHILIP J. 1987. *Controlling Life. Jacques Loeb and the Engineering Ideal in Biology*. New York, Oxford: Oxford University Press
- PAULY, PHILIP J. The eugenic industry 'growth or restructuring?' *Journal of the history of biology* 26 (1): 131-45, Spring 1993
- PEARSON, KEITH ANSELL. 1997. *Vivoid life. Perspectives on Nietzsche and the transhuman condition*. London & New York: Routledge
- PELLEGRINO, EDMUND D. 1979. *Humanism and the Physician*. Knoxville: The University of Tennessee Press
- PELLICANI LUCIANO. 2000. *I nemici della modernità*. Roma: Ideazione Editrice
- NGUYEN PIERRE VAN-HUY, NGOC-MAI PHAN THI. 1974. *La chute de Camus, ou, Le dernier testament :étude du message camusien de responsabilité et d'authenticité selon La chute*. Neuchâtel: Editions de la Baconnière
- PENCE, GREGORY E. (ed.). 1998. *Flesh of my flesh. The ethics of human cloning*. Lanham [etc.]: Rowman & Littlefield publishers
- PERNICK, MARTIN S. 1996. *The Black Stork*. New York, Oxford: Oxford university press
- PERRY, MARY E., CRUZ, ANNE J. (eds.) 1991. *Cultural encounters: the impact of the Inquisition in Spain and the New World*. Berkeley [etc.]: University of California Press
- PERSELL, STUART M. 1999. *Neo-Lamarckism and the evolution controversy in France, 1870-1920* Lewiston: Edwin Mellen Press
- PERUTZ, MAX F. 1989. *Is Science necessary? Essays on science and scientists*. London: Barrie & Jenkins
- PETERS TED (ed.). 1998. *Genetics. Issues of social justice*. Cleveland: Pilgrim Press
- PETERSEN ALAN, BUNTON ROBIN. 1997. *Foucault, Health and Medicine*. Routledge: London & New York
- PETRONI A., VIALE R. (Eds.). 1997. *Individuale e Collettivo*. Milano: Raffaello Cortina Editore
- PETRUSZELLIS NICOLA. 1983. *La crisi dello scientismo*. Milano: Nuovo istituto editoriale italiano.
- PFEIFFER JÜRGEN (ed.). 1992. *Menschenverachtung und Opportunismus* Tübingen: Attempto Verlag
- PICHOT ANDRÉ. 1995. *L'engénisme ou les généticiens saisis par la philanthropie*. Paris: Hatier.
- PICHOT ANDRÉ. 1999. *Histoire de la notion de gène*. Paris: Flammarion.
- PICHOT ANDRÉ. 2000. *La société pure, de Darwin à Hitler*. Paris: Flammarion.
- PICK DANIEL. 1989. *Faces of degeneration: a European disorder 1848-1918*. Cambridge: Cambridge University Press
- PICKENS, DONALD K. 1968. *Eugenics and the progressives*. Nashville, Tennessee: Vanderbilt University Press

- PIPPIN, ROBERT B. 1999. *Modernism as a philosophical problem: on the dissatisfactions of European high culture*. Oxford: Blackwell.
- PLATEN-HALLERMUND, ALICE. 1993. *Die Tötung Geisteskranker in Deutschland*. Psychiatrie-Verlag, Bonn 1993
- PLATT, JOHN RADER. 1962. *The excitement of science*. Boston: Houghton Mifflin
- POGLIANO CLAUDIO. 1984. Scienza e stirpe: eugenica in Italia 1912-1939. *Passato e Presente* 5, *Rivista di storia contemporanea*: 61-97
- POIS ROBERT A. 1986. *National socialism and the religion of nature*. London: Croom Helm.
- POLIAKOV LÉON. 1980. *La causalité diabolique. Essai sur l'origine des persécutions*. Paris : Calmann-Lévy
- PONTIFICIAE ACADEMIAE SCIENTIARUM - SCRIPTA VARIA. 2001. *Science and the future of mankind*. Vatican City: P.A.S.
- PORTER DOROTHY. 1991. «Enemies of the race»: biologism, environmentalism, and public health in Edwardian England. *Victorian Studies* 34 (1991): 159-178
- PORTER DOROTHY. 1999. *Health, Civilization and the State*. Routledge: London and New York
- PORTER ROY. 1996. The two cultures revisited. *Boundary 2*, Vol. 23, No. 2 (Summer, 1996), 1-17
- PORTER ROY. 2000. *Enlightenment. Britain and the creation of the modern world*. London [etc.]: Penguin Books
- PORTMANN ADOLF. 1970. *Entläßt die Natur den Menschen? Gesammelte Aufsätze zur Biologie und Anthropologie*. München: R. Piper & Co. Verlag
- POSNER, RICHARD A. 1992. *Sex and reason*. Cambridge, Mass.: Harvard University Press
- PRESIDENT'S COUNCIL ON BIOETHICS. 2002. www.bioethics.gov
- PRICE MATT. 1995. Roots of dissent: the Chicago Met Lab and the origin of the Franck Report. *Isis*, Vol. 86, No. 2 (Jun., 1995), 222-244
- PROCTOR, ROBERT N. 1988. *Racial Hygiene: medicine under the Nazis*. Cambridge, Massachusetts, London, England: Harvard University Press.
- PROCTOR, ROBERT. 1991. *Value-Free Science*. Cambridge, Massachusetts, London, England: Harvard University Press.
- PROCTOR, ROBERT. 1996. Nazi Medicine and Public Health Policy. *Dimensions*: 2.
- PROCTOR, ROBERT. 1999. *The Nazi war on cancer*. Princeton University Press, Princeton, 1999
- PROPPING PETER, SCHOTT HEINZ (eds.). 1992. *Wissenschaft auf Irrwegen*. Bonn, Berlin: Bouvier.
- PUKA BILL. 1982. An interdisciplinary treatment of Kohlberg. *Ethics*, Vol. 92, No. 3, Special Issue: Symposium on Moral Development (Apr., 1982), 468-490
- PYENSON LEWIS, SHEETS-PYENSON SUSAN. 1999. *Servants of Nature. A history of scientific institutions, enterprises and sensibilities*. HarperCollins Publishers.
- QUINE, MARIA SOPHIA. 1996. *Population politics in twentieth century Europe: fascist dictatorships and liberal democracies*. London: Routledge.
- RABINOW PAUL. 1984. *The Foucault Reader*. Harmondsworth, Middlesex, England: Penguin Books.
- RABINOW PAUL. 1996a. *Essays on the Anthropology of Reason*. Princeton: Princeton University Press.
- RABINOW PAUL. 1996b. *Making PCR: a story of biotechnology*. Chicago: University of Chicago Press.
- RABINOW PAUL. 1999. *French DNA: trouble in purgatory*. Chicago London: University of Chicago Press.
- RADIN PAUL. 1972. *The trickster: a study in American Indian mythology*. New York: Greenwood Press, 1972
- RAMSEY PAUL. 1971. *Fabricated Man: the ethics of genetic control*. New Haven and London: Yale University Press
- RAPP RAYNA. 1988. Chromosome and communication: the discourse of genetic counselling. *Medical Anthropology Quarterly*, New Series, Vol. 2, No 2 (Jun. 1988), 143-157
- RAPP RAYNA. 2000. *Testing women, testing the fetus: the social impact of amniocentesis in America*. New York: Routledge
- RAPPORT NIGEL. 2002. Relations between science and culture in the ideal polity: an anthropological view. *Interdisciplinary Science Reviews*. Vol. 27, No. 1, pp. 25-31
- RASMUSSEN CHARLES, TILMAN RICK. 1998. *Jacques Loeb: his science and social activism and their philosophical foundations*. Philadelphia, American Philosophical Society
- RASMUSSEN DAVID M. (ed.). 1996. *The Handbook of critical theory*. Oxford; Cambridge, Mass.: Blackwell Publishers.
- RAVIN, ARNOLD W. 1978. Genetics in America. A historical overview *Perspectives in Biology and Medicine* 21, 2 Winter 1978
- RAWLINS F. I. G. 1950. Episteme and Techne. *Philosophy and Phenomenological Research*. Vol. 10, No. 3. pp. 389-397.
- READER IAN. 2000. *Religious violence in contemporary Japan: the case of Aum Shinrikyō*. Richmond : Curzon
- REHG WILLIAM. 1994. *Insight and Solidarity: A Study in the Discourse Ethics of Jürgen Habermas*. Berkeley: University of California Press
- REICH, THOMAS W. (ed.) 1995. *Encyclopaedia of bioethics*. New York: Macmillan Pub. Co: Simon & Schuster Macmillan ; London : Prentice Hall International.
- REICH WILHELM. 1975. *The Mass Psychology of Fascism*. Harmondsworth: Pelican, Penguin Books
- REICHEL NORBERT. 1994. *Der Traum vom Höheren Leben*. Darmstadt: Wissenschaftliche Buchgesellschaft
- REICHLIN MASSIMO. 2002. *L'etica e la buona morte*. Torino: Edizioni di Comunità.
- REILLY PHILIP. 1983. The surgical solution: the writings of activist physicians in the early days of eugenical sterilization. *Perspectives in Biology and Medicine* 26,4 Summer 1983
- REILLY, PHILIP R. 2000. *Abraham Lincoln's DNA*. Cold Spring Harbor, New York: Cold Spring Harbor Laboratory Press
- RENNEBURG MONIKA, WALKER MARK. 1993. *Science, technology, and national socialism*. Cambridge [England] New York: Cambridge University Press.
- REPP KEVIN. 2000. *Reformers, Critics, and the Path of German modernity. Anti-politics and the Search for Alternatives, 1890-1914*. Cambridge Mass., London: Harvard University Press
- RESNIK, DAVID B. 1998. *The ethics of science*. London and New York: Routledge
- REYER JÜRGEN. 1991. *Alte Eugenik und Wohlfahrtspflege*. Freiburg: Lambertus
- REYNA S.P. 1994. Literary anthropology and the case against science, *MAN*, 29, 555-581.
- RICH PAUL. 1990. Race, science, and the legitimization of white supremacy in South Africa, 1902-1940. *The international journal of African studies*, Volume 23, Issue 4: 665-686
- RICHTER STEFFI, SCHAD-SEIFERT ANNETTE (eds.). 2001. *Cultural studies and Japan*. Leipzig: Leipziger Universitätsverlag.
- RIGOTTI FRANCESCA. 1986. Biology and society in the age of Enlightenment. *Journal of the History of Ideas* 47, pp. 215-233
- ROBERTS CATHERINE. 1964. Some reflections on positive eugenics. *Perspectives in Biology and Medicine* 7, 3 Spring 1964
- ROBINSON, TIMOTHY C.L. 1977. The future of science. 1975 Nobel Conference. New York [etc.]: John Wiley & Sons
- ROGER JACQUES. 1997. *The life sciences in eighteenth-century French thought*. Stanford: Stanford University Press
- ROLL-HANSEN NILS. 1980. Eugenics before World War II. The case of Norway. *History and philosophy of the life sciences*, 2: 269-298.

- ROLL-HANSEN NILS. 1989a. Eugenic sterilization: a preliminary comparison of the Scandinavian experience to that of Germany. *Genome*, Vol. 31, 1989: 890-895
- ROLL-HANSEN NILS. 1989b. Geneticists and the eugenics Movement in Scandinavia. *BJHS*, 1989, 22, 335-346
- ROLL-HANSEN NILS. eugenics practices and genetic science in Scandinavia and Germany. Some comments on Peter Weingart's comparison of Sweden and Germany. *Scandinavian Journal of History* (2001) 26:75-82
- ROOTH DEBORAH. Speaking Christian: Orthodoxy and Difference in Sixteenth-Century Spain. *Representations* 23: 118-34, Summer 1988
- RORVIK, DAVID M. 1971. *Brave New Baby. Promise and peril of the biological revolution*. Garden City, New York: Doubleday & Co.
- ROSE STEVEN, KAMIN, LEON J., LEWONTIN, RICHARD C. 1984. *Not in our genes: biology, ideology and human nature*. Harmondsworth: Penguin.
- ROSE STEVEN, APPIGNANESI LISA. 1986. *Science and beyond*. Oxford: Basil Blackwell in association with the Institute of Contemporary Arts.
- ROSE TRICIA ET AL. 1995. Race and racism: a symposium. *Social Text*, No. 42 (Spring 1995), 1-52
- ROSENFELD ALBERT. 1969. *The Coming Control of Life*. Englewood Cliffs: Prentice-Hall, Inc.
- ROSSI PAOLO. 1962. *I filosofi e le macchine*. Milano: Feltrinelli
- ROSSI PAOLO, FERRONE VINCENZO. 1994. *Lo scienziato nell'età moderna*. Roma, Bari: Laterza
- ROSSI PAOLO. 1995. *Naufragi senza spettatore*. Bologna: Il Mulino
- ROSTAND JEAN. 1956. *Peut-on modifier l'homme?* Paris: Gallimard
- ROTH KARL-HEINZ (ed.). 1984. *Erfassung zur Vernichtung*. Berlin: Gesundheit Berlin.
- ROUBAN LUC. 1988. *L'État et la Science*. Paris Editions du CNRS.
- ROUCLOUX JOEL. 2002. Can democracy survive the disgust of man for man? From social Darwinism to eugenics. *Diogenes*, Fall 2002 v49 i195 p47(5)
- RUDERMAN RICHARD S. 1999. Odysseus and the Possibility of Enlightenment. *American Journal of Political Science*. Vol. 43, No. 1, pp. 138-161.
- RUSSELL, COLIN A. 1983. *Science and Social Change: 1700-1900*. London: Macmillan
- RUSSELL BERTRAND. 1927. *Icarus: or The future of science*, London: K. Paul, Trench, Trubner & co.
- RUSSELL BERTRAND. 1961 (1935). *Religion and Science*. London [etc.]: Oxford University press
- RYAN, PATRICK J. 1997. Unnatural selection: intelligence testing, eugenics, and American political cultures. *Journal of social History* 30: 669-686
- SALOMON FRANK, SCHWARTZ, STUART B. 1999. *The Cambridge History of the Native Peoples of the Americas*. Cambridge: Cambridge University Press
- SALOMON JEAN-JACQUES. 1970. *Science et Politique*. Paris. Éditions du Seuil.
- SALVATORELLI LUIGI. 1957. *Storia del Novecento*. Milano: Arnoldo Mondadori Editore.
- SANDKÜHLER, HANS J., HOLZ, HANS H. 1987. *Humanität, Vernunft und Moral in der Wissenschaft*. Köln: Pahl-Rugenstein
- SANG, JAMES H. 1997. Biology and the Nazis. *The Quarterly Review of Biology*, 72,3 September 1993
- SARTRE, JEAN-PAUL. 1960. *Critique de la raison dialectique*. Paris: Gallimard.
- SARTRE, JEAN-PAUL. 1957. *Being and nothingness: an essay on phenomenological ontology*. Methuen.
- SAVAN BETH. 1988. *Science under Siege. The myth of objectivity in scientific research*. Montreal [etc.]: CBC enterprises
- SAVATER FERNANDO. 1995. *Diccionario filosófico*. Barcelona, Planeta.
- SAVATER FERNANDO. 1998. *Despierta y lee*. Madrid: Alfaguara
- SAVULESCU JULIAN. 1999. Should we clone human beings? Cloning as a source of tissue for transplantation. *The New Genetics. Journal of Medical Ethics [Special Issue]* 25(2): 75-214.
- SAX BORJA. 2000. *Animals in the Third Reich. Pets, scapegoats, and the Holocaust*. New York and London: Continuum
- SCAFF, LAWRENCE A. 1987. Fleeing the iron cage: politics and culture in the thought of Max Weber. *The American Political Science Review*, vol. 81, No. 3 (Sep. 1987), 737-756
- SCALFARI EUGENIO. 2001. *Attualità dell'Illuminismo*. Roma-Bari: Laterza.
- SCANLAN, JAMES P. 1999. The case against rational egoism in Dostoevsky's "Notes from Underground". *Journal of the History of Ideas*. July 1999: 549-567
- SCARDIGLI VICTOR. 1992. *Les Sens de la technique*. Paris: Presses Universitaires de France
- SCHACHT RICHARD (Ed.). 1994. *Nietzsche, genealogy, morality. Essays on Nietzsche's Genealogy of Morals*. Berkeley, Los Angeles, London: University of California Press
- SCHAFER WOLFGANG (ed.) 1995. *Folgen der Ausgrenzung. Studien zur NS-Psychiatrie in der Rheinprovinz*. Köln: Pulheim
- SCHANK GERD. 2000. *"Rasse" und "Züchtung" bei Nietzsche*. Berlin, New York: Walter de Gruyter.
- SCHENK, HANS G. 1979. *The mind of the European Romantics: an essay in cultural history*. Oxford: Oxford University Press.
- SCHERER KLAUS. 1990. "Asozial" im Dritten Reich. Die vergessenen Verfolgten. Münster: Votum Verlag
- SCHICK TOM W. 1982. "Race, class and medicine: "bad blood" in twentieth-century America". *The Journal of Ethnic Studies*. 10:2 Summer
- SCHIEBINGER LONDA. 1990. The Anatomy of difference: race and sex in eighteenth-century science. *Eighteenth-Century Studies* 23: 387-405
- SCHILPP, PAUL ARTHUR. 1988. *Albert Einstein: Philosopher-Scientist*. La Salle [etc.]: Open Court
- SCHMUHL HANS-WALTER. 1987. *Rassenhygiene, Nationalsozialismus, Euthanasie*. Göttingen: Vandenhoeck & Ruprecht
- SCHNEIDER WILLIAM. 1982. Toward the Improvement of the Human Race: The History of Eugenics in France. *The Journal of Modern History*. Vol. 54, No. 2, *Sex, Science, and Society in Modern France*. pp. 268-291
- SCHNEIDER, WILLIAM H. 1994. Hérité, sang, et opposition à l'immigration dans la France des années trente. *Ethnologie Française*. 24: 104-117
- SCHROEDER RALPH. *Max Weber and the sociology of culture*. 1992. London: Sage.
- SCHWARTZ JOSEPH. 1992. *The creative moment. How science made itself alien to modern culture*. New York: HarperCollins
- SCHWARTZ MICHAEL. 1995. *Sozialistische Eugenik*. Bonn: J.H.W. Dietz Nachfolger
- SCHWEBER, SILVAN S. 2000. *In the shadow of the bomb: Berke, Oppenheimer, and the moral responsibility of the scientist*. Princeton: Princeton University Press.

- SEIDELMAN WILLIAM E. 1988. Mengele Medicus: Medicine's Nazi Heritage. *The Milbank Quarterly*, Vol. 66, No. 2.
- SEIDELMAN WILLIAM E. Lessons from eugenic history (correspondence). *Nature*. Vol. 337, 26 January 1989
- SEIDELMAN WILLIAM E. 1989. Medical selection: Auschwitz antecedents and effluent. *Holocaust and Genocide studies*, Vol. 4, No. 4, pp. 435-448
- SEIDELMAN, WILLIAM E. May 2 1989. Twins, Jewish twins, Auschwitz and Jerusalem. *Jerusalem Post*
- SEIDELMAN WILLIAM E. 1996. Nuremberg Lamentation: for the forgotten victims of medical science. *BMJ*, 313: 1463-1467
- SEIDLER HORST, RETT ANDREAS. 1982. *Das Reichsippenamt entscheidet. Rassenbiologie im Nationalsozialismus*. Wien, München: Jugend und Volk
- SELDEN STEVEN. 1999. *Inheriting Shame. The story of eugenics and racism in America*. New York and London: Teachers College, Columbia University
- SHALIN, DMITRI N. 1992. Critical Theory and the Pragmatist Challenge. *American Journal of Sociology*, Vol. 98, No. 2., pp. 237-279
- SHANNON, THOMAS A. (ed.) 1993. *Bioethics: basic writings on the key ethical questions that surround the major, modern biological possibilities and problems*. Mahwah, N.J.: Paulist Press.
- SHAW BRIAN J. 1985. Reason, Nostalgia, and Eschatology in the Critical Theory of Max Horkheimer. *The Journal of Politics*. Vol. 47, No. 1. pp. 160-181
- SHINE IAN, WROBEL SYLVIA. 1976. *Thomas Hunt Morgan. Pioneer of genetics*. Lexington: The University Press of Kentucky
- SHIPMAN PAT. 1994. *The evolution of racism*. New York: Simon & Schuster.
- SIEFERLE, ROLF PETER. 1989. *Die Krise der menschlichen Natur*. Frankfurt am Main: Suhrkamp Verlag.
- SIERRA, ALVARO GIRÓN. 1996. *Evolucionismo y anarquismo en España 1882-1914*. Madrid: Consejo Superior de Investigaciones Científicas, Centro de Estudios Históricos.
- SILVER LEE. 1998. *Remaking Eden: cloning and beyond in a brave new world*. New York: Avon
- SIMONNOT ANNE-LAURE. 1999. *Hygiénisme et eugénisme au XX^e siècle à travers la psychiatrie française*. Paris: Seli Arslan
- SIMONNOT ANNE-LAURE. 2001. Un enjeu éthique du XX^e siècle : la question de l'eugénisme. *Annales medico-psychologiques, revue psychiatrique*, Vol. 159, Issue 1, February 2001, pp. 23-26
- SIMPSON, GEORGE GAYLORD. 1966. *Biology and Man*. Harcourt, Brace & World, Inc., New York
- SINDERMANN, CARL J. 1985. *The Joy of Science. Excellence and its rewards*. New York and London: Plenum Press
- SINGER ELEANOR, CORNING AMY, LAMIAS MARK. 1998. Trends: genetic testing, engineering, and therapy; awareness and attitudes. *Public Opinion Quarterly*, vol. 62, No. 4 (Winter, 1998), 633-664.
- SINGER, JONATHAN S. 2001. *The Splendid Feast of Reason*. Berkeley, Los Angeles, London: University of California Press
- SINGER PETER, WELLS DEANE. 1985. *Making Babies. The new science and ethics of conception*. New York: Charles Scribner's Sons
- SINGER PETER. 1994. *Rethinking life & death. The collapse of our traditional ethics*. New York: St. Martin's press
- SINGER PETER KUHSE HELGA. 1994. *Individuals, humans, persons. Questions of life and death*. Sankt Augustin: Academia
- SINGER PETER, KUHSE HELGA (eds.). 1999. *Bioethics, an anthology*. Oxford: Blackwell Publishers
- SINGER PETER. 1999. *A Darwinian left: politics, evolution and cooperation*. London, Weidenfeld & Nicolson.
- SINGER PETER. 2000. *Writings on an ethical life*. London: Fourth Estate
- SINTOMER YVES. 1999. *La démocratie impossible?* Paris: Éditions la Découverte.
- SISMONDO SERGIO. 1996. *Science without myth*. Albany: State University of New York Press.
- SKRABANEK PETER. 1992. The poverty of epidemiology. *Perspectives in Biology and Medicine* 35,2 Winter 1992
- SLOTERDIJK PETER. 1999. *Regeln für den Menschenpark*. Frankfurt am Main: Suhrkamp Verlag.
- SLOTERDIJK PETER. 2001. *Das Menschentreibhaus: Stichworte zur historischen und prophetischen Anthropologie. Vier große Vorlesungen*. Weimar: Verlag und Datenbank für Geisteswissenschaften.
- SLOTTEN, HUGH R. 1990. Humane Chemistry or Scientific Barbarism? American Responses to World War poison gas, 1915-1930. *The Journal of American History*, vol. 77, No. 2 (Sep., 1990), 476-498
- SMART BARRY. 1992. *Modern conditions, postmodern controversies*. London: Routledge.
- SMITH ANTHONY. 1975. *The Human Pedigree. Inheritance and the genetics of mankind*. London: Gorge Allen & Unwin LTD
- SMITH, J. DAVID. 1985. *Minds made feeble: the myth and the legacy of the Kallikaks*. Rockville: Aspen Systems Corporation
- SMITH, J. DAVID. 1993. *The eugenic assault on America. Scenes in red, white, and black*. George Fairfax, Virginia: Mason University Press
- SMITH, J. DAVID, MITCHELL, ALISON L. 2001. Disney's Tarzan, Edgar Rice Burrough's eugenics, and visions of utopian perfection. *Retardation*. Vol. 39, No. 3, June 2001
- SOLOWAY, RICHARD A. 1990. *Demography and Degeneration*. Chapel Hill and London: The University of North Carolina Press
- SORELL TOM. 1991. *Scientism: philosophy and the infatuation with science*. London: Routledge.
- SOUPAULT ROBERT. 1951. *Alexis Carrel*. Paris: Plon
- SPALLONE PATRICIA, LYNN-STEINBERG, DEBORAH (eds.). 1987. *Made to order. The myth of reproductive and genetic progress*. Oxford [etc.]: Pergamon Press
- SPIEGEL-RÖSING INA, DE SOLLA PRICE DEREK. 1977. *Science, Technology and Society*. London and Beverly Hills: Sage.
- SPITZ DAVID. 1965. *Patterns of Anti-democratic thought*. New York: Free Press
- SPRINKLE, ROBERT HUNT. 1994. *Profession of Conscience. The Making and Meaning of life-sciences liberalism*. Princeton, New Jersey: Princeton University Press
- SPRINTZEN DAVID. 1988. *Canis: a critical examination*. Philadelphia: Temple University Press
- STAUDINGER HANSJÜRGEN. 1992. *Freiheit und Verantwortung in der Wissenschaft*. Paderborn. Ferdinand Schöningh
- STAUM MARTIN. 1995. Physiognomy and phrenology at the Paris Athénée. *Journal of the History of Ideas*, 56, 3: p. 443-462
- STOCK GREGORY, CAMPBELL JOHN (eds.). 2000. *Engineering the Human Germline*. Oxford: Oxford University Press
- STOVE DAVID C. 1991. *The Plato cult and other philosophical follies*. Oxford: Basil Blackwell.
- STEHR NICO. 1994. *Knowledge societies*. London: Sage
- STEIN GEORGE. 1988. Biological science and the roots of Nazism. *American Scientist*, 76(1), 1988
- STENECK, NICHOLAS H. (ED.). 1975. *Science and Society*, Ann Arbor: the University of Michigan Press.
- STEPAN NANCY. 1982. *The idea of race in science: Great Britain 1800-1960*. London and Basingstoke: MacMillan
- STEPAN, NANCY LEYS. 1986. Race and Gender: the role of analogy in science. *Isis*, vol. 77, no. 2 (Jun. 1986), 261-277
- STEWART LARRY. 1998. A Meaning for Machines: Modernity, Utility, and the Eighteenth-Century British Public. *The Journal of Modern History*. Vol. 70, No. 2. pp. 259-294.

- STEYN MELISSA. 2001. *Whiteness just isn't what it used to be. White identity in a changing South Africa*. Albany: SUNY Press
- STOCK GREGORY. 1993. *Metaman: the merging of humans and machines into a global superorganism*. New York: Simon & Schuster.
- STOCK GREGORY, CAMPBELL JOHN (eds.). 2000. *Engineering the Human Germline*. Oxford: Oxford University Press
- STOCK GREGORY. 2002. *Redesigning Humans. Our inevitable genetic future*. Boston, New York: Houghton Mifflin Company
- STONE DAN. 2002. *Breeding Superman. Nietzsche, Race and Eugenics in Edwardian and Interwar Britain*. Liverpool: Liverpool University Press
- STONE NORMAN. 1999. *Europe transformed 1878-1919*. Oxford UK: Blackwell publishers
- STOVE DAVID. 1991. *The Plato Cult and Other Philosophical Follies*. Oxford, Cambridge Mass.: Basil Blackwell
- SUMNER L.W., BOYLE JOSEPH (eds.). 1996. *Philosophical perspectives on bioethics*. Toronto [etc.]: University of Toronto Press
- SUZUKI DAVID. 1989. *Inventing the future*. Toronto: Stoddart
- SWEET, JAMES H. 1997. The Iberian roots of American racist thought. *The William and Mary Quarterly*, vol. 54, no. 1 (Jan. 1997), 143-166.
- SZÖLLÖSI-JANZE MARGIT (ed.). 2001. *Science in the Third Reich*. Oxford New York: Berg.
- TAGLIAPIETRA ANDREA. 1997. *Che cos'è l'illuminismo? I testi e la genealogia del concetto*. Milano: Mondadori.
- TAGUIEFF, PIERRE-ANDRÉ. 1987. *La force du préjugé : essai sur le racisme et ses doubles*. Paris: Éditions la Découverte
- TAKAKI RONALD. 1978. Aesculapius was a white man: Antebellum racism and male chauvinism at Harvard Medical School. *Phylon: Atlanta University Review of Race and Culture* 39: 128-134
- TALMON, JACOB L. 1960. *Political messianism. The Romantic phase*. London: Secker & Warburg
- TALMON, JACOB L. 1970. *The origins of totalitarian democracy*. New York Frederick A. Praeger
- TALMON, JACOB L. 1981. *The Myth of the Nation and the vision of revolution*. London: Secker & Warburg
- TAMBIAH, STANLEY JEYARAJA. 1990. *Magic, science, religion, and the scope of rationality* Cambridge: Cambridge University Press.
- TAYLOR CHARLES. 1984. Foucault on freedom and truth. *Political theory*, Vol. 12, No. 2 (May 1984), 152-183
- TAYLOR, GORDON RATTRAY. 1968. *The biological time-bomb*. London: Thames and Hudson
- TAYLOR JAY. 1993. *The Rise and Fall of Totalitarianism in the Twentieth Century*. New York: Paragon House
- TEAYS WANDA, PURDY, LAURA M. (eds.). 2001. *Bioethics, Justice, and Health Care*. Wadsworth/Thomson learning: Belmont Ca (USA)
- TEICH, ALBERT H. (ed.) 1986. *Technology and the future*. New York: St. Martin's Press.
- TEICH MIKULÁŠ, PORTER ROY, GUSTAFSSON BO. 1997. *Nature and society in historical context*. Cambridge [etc.]: Cambridge University Press.
- TEICHMAN JENNY, EVANS, KATHERINE C. 1991. *Philosophy: a beginner's guide*. Oxford: Blackwell
- TEICHMAN JENNY. 1997. *Polemical Papers*. Aldershot [etc.]: Ashgate
- TEICHMAN JENNY, WHITE GRAHAM (eds.). 1995. *An introduction to modern European philosophy*. Basingstoke : Macmillan
- TEICHMAN JENNY. 2001. *Ethics and reality: collected essays*. Aldershot; Burlington, Vt.: Ashgate.
- TEMKIN OWSEI. 1969. Historical reflections on the scientist's virtue. *Isis*, Vol. 60, No. 4 (Winter, 1969), 427-438
- TEMKIN OWSEI. 2002. "On second thought" and other essays in the history of medicine and science. Baltimore and London: The Johns Hopkins University Press
- TESSON CHARLES. 1995. *Luis Buñuel, Éditions de l'Étoile, cahiers du cinéma : Paris*.
- TESTART JACQUES. 1994. *Le désir du gène*. Paris: Flammarion
- THODY PHILIP. 1989. *Albert Camus*. Houndsmills and London: Macmillan
- THOM ACHIM, RAPOPORT SAMUEL M. (eds.). 1989. *Das Schicksal der Medizin im Faschismus. Auftrag und Verpflichtung zur Bewahrung von Humanismus und Frieden*. Neckarsulm, München: Jungjohann Verlagsgesellschaft
- THOMAS JEAN-PAUL. 1995. *Les fondements de l'engénierie*. Paris: Presses universitaires de France
- THOMPSON JON, BAIRD PATRICIA, DOWNIE JOCELYN. 2001. *The Olivieri Report*. Toronto: James Lorimer & Co.
- THUILLIER PIERRE. Les expérimentations nazies sur l'hypothermie, *La Recherche*, 227 decembre 1990 vol. 21
- THUMS KARL. 1968. *Gesundes Erbe, Gesundes Volk*. Wien: [?]
- TIMSON JOHN, KEYNES MILO, PEEL JOHN (eds.). 1998. *Essays in the history of eugenics*. London: the Chameleon Press.
- TIPLER, FRANK J. 1994. *The physics of immortality: modern cosmology, God, and the resurrection of the dead*. New York: Doubleday.
- TOKAR BRIAN (ed.). 2001. *Redesigning Life? The worldwide challenge to Genetic Engineering*. Montreal [etc.]: McGill-Queen's University Press
- TOMES NANCY. 1998. *The Gospel of Germs: Men, Women, and the Microbe in American Life*. Cambridge, Massachusetts: Harvard University Press
- TORSTENDAHL ROLF. 1990. *The formation of professions: knowledge, state and strategy*. London [etc.]: Sage.
- TOULMIN STEPHEN. 1992. *Cosmopolis: the hidden agenda of modernity*. Chicago: University of Chicago Press.
- TOURAINÉ ALAIN. 1981. *The voice and the eye: an analysis of social movements*. Cambridge: Cambridge University Press.
- TOURNIER MICHEL. 1970. *Le Roi des Aulnes*. Paris: Gallimard.
- TRACE ARTHUR. 1988. *Furnace of Doubt. Dostoevsky & the Brothers Karamazov*. Peru, Illinois: Sherwood Sugden
- TRUITT, WILLIS H., SOLOMONS, T.W. GRAHAM, (eds.). 1974. *Science, Technology, and Freedom*. Boston: Houghton Mifflin.
- TUCKER, WILLIAM H. 1994. *The Science and Politics of Racial Research*. Urbana and Chicago: University of Illinois Press
- TUDGE COLIN 2002 *In Mendel's footnotes*. London: Vintage
- TURNER, BRYAN S. 1987. *Medical power and social knowledge*. London: Sage.
- TURNER, BRYAN S. 1992. *Regulating bodies*. London, New York: Routledge.
- TURNER STEPHEN (ed.). 2000. *The Cambridge companion to Weber*. Cambridge: Cambridge University Press
- TURNER STEPHEN. What is the Problem with Experts? *Social studies of science*. 31/1 February 2001
- USBORNE CORNELIE. 1992. *The politics of the body in Weimar Germany: women's reproductive rights and duties*. Basingstoke: Macmillan Press.
- UTKE, ALLEN R. 1978. *Bio-Babel. Can we survive the New Biology?* Atlanta: John Knox Press
- VAN DEN BERG, AXEL. 1980. Critical Theory: Is There Still Hope? *American Journal of Sociology*. Vol. 86, No. 3. pp. 449-478.
- VAN DEN BERG, AXEL. 1996. Liberalism without Reason? *Contemporary Sociology*. Vol. 25, No. 1. pp. 19-25.
- VANDERMEER JOHN. 1996. *Reconstructing biology. Genetics and ecology in the New World Order*. New York [etc.]: John Wiley & Sons

- VAN DE VYVER, GISELE, REISSE JACQUES. 1991. *Les savants et la politique à la fin du XVIII^e siècle*. Bruxelles. Éditions de l'université de Bruxelles
- VAN RENSSLAER-POTTER. 1990. Getting to the year 3000: can global bioethics overcome evolution's fatal flaw? *Perspectives in Biology and Medicine* 34,1 Autumn 1990
- VAN RENSSLAER-POTTER. 1995. Global bioethics: linking genes to ethical behaviour. *Perspectives in Biology and Medicine* 39,1 Autumn 1995
- VASBINDER SAMUEL HOLMES. 1984. *Scientific attitudes in Mary Shelley's Frankenstein*. Ann Arbor, Michigan: Umi Research Press
- VASOLD MANFRED. 1988. *Rudolf Virchow: der Große Arzt und Politiker*. Stuttgart: Deutsche Verlags-Anstalt
- VAUGHAN, TED R., SMITH, DOUGLAS H., SJOBERG GIDEON. 1966. The religious orientations of American natural scientists. *Social Forces*, Vol. 44, No. 4 (Jun., 1966), 519-526
- VAUGHN, BLANKENSHIP L. 1973. The scientist as "Apolitical" Man. *The British Journal of Sociology*. Vol. 24, No. 3 (Sep., 1973), 269-287
- VENTURI FRANCO. 1970. *Utopia e riforma nell'Illuminismo*. Torino: Einaudi
- VIALE RICCARDO (ed.). 2001. *Knowledge and Politics*. Heidelberg, New York: Physica-Verlag.
- VIGARELLO GEORGES. 1993. *Le sain et le malsain*. Paris: Seuil
- VIGGIANI, CARL A. 1960. Camus and the fall from innocence. *Yale French Studies*, No. 25, Albert Camus (1960), 65-71
- VILA ANNA. 1998. *Enlightenment and Pathology: Sensibility in the Literature and Medicine of Eighteenth-Century France*. Baltimore: Johns Hopkins.
- VILLANUEVA, JOAQUIN. P., BONET, BARTOLOME E. (eds.) 1993. *Historia de la Inquisición en España y America*. Madrid: Centro de Estudios Inquisitoriales.
- VOGT MARKUS. 1997. *Sozialdarwinismus*. Freiburg [etc.]: Herder.
- VOLLRATH JOHN. 1990. *Science and moral values*. Lanham [etc.]: University Press of America
- VON SCHOMBERG, RENÉ (ed.). 1993. *Science, politics and morality*. Dordrecht, Boston, London: Kluwer academic publishers.
- VOSSEN JOHANNES. 2001. *Gesundheitsämter im Nationalsozialismus. Rassenhygiene und offene Gesundheitsfürsorge in Westfalen 1900-1950*. Essen: Klartext Verlag
- WAGGONER HYATT HOWE. 1943. T. S. Eliot and the Hollow Men. *American Literature*. Vol. 15, No. 2. pp. 101-126
- WALKER CASEY (ed.). 2000. *Made not born. The troubling world of biotechnology*. San Francisco: Sierra Club Books.
- WALLER JOHN. 2001. Ideas of heredity, reproduction and eugenics in Britain, 1800-1875. *Studies in history and philosophy of science. Studies in history and philosophy of biological and biomedical sciences*. Vol. 32, Issue 3, September 2001, pp. 457-489.
- WALTERS, RONALD G. (ed.). 1997. *Scientific authority & Twentieth-Century America*. Baltimore and London: Johns Hopkins University Press
- WANG JESSICA. 1999. *American Science in an Age of Anxiety*. Chapel Hill and London: University of North Carolina Press.
- WATSON JAMES D. 2000. *A passion for DNA: genes, genomes, and society*. Oxford, New York: Oxford University Press
- WATSON, JAMES D. 2002. *Genes, girls and Gamow*. New York: Alfred A. Knopf
- WATTS ROB. 1994. Beyond nature and nurture: eugenics in Twentieth Century Australian History. *The Australian Journal of Politics and History*, 40, 304-334
- WEBER MAX. 1949. *The methodology of the social sciences*. New York: Free Press.
- WEBER MAX. 1968. *Methodologische Schriften: Studienausgabe*. Frankfurt am Main: Fischer.
- WEBER MAX. 1972a. *Wirtschaft und Gesellschaft: Grundriss der verstehenden Soziologie*. Tübingen: Mohr.
- WEBER MAX. 1972b. *Gesammelte Aufsätze zur Religionssoziologie*. Tübingen. C.H. Mohr.
- WEBER MAX. 1992. *Wissenschaft als Beruf: 1917/1919 Politik als Beruf: 1919*, Tübingen: J. C. B. Mohr.
- WEBER MAX. 2000. *Die protestantische Ethik und der Geist des Kapitalismus*. Weinheim: Beltz.
- WEBSTER ANDREW. 1994. International evaluation of academic-industry relations: contexts and analysis. *Science and Public Policy*. 21/2 April 1994
- WEBSTER CHARLES. 1976. *The great instauration: science, medicine and reform, 1626-1660*. London: Duckworth
- WEBSTER CHARLES (ed.). 1981. *Biology, medicine and society 1840-1940*. Cambridge [etc.]: Cambridge University Press
- WEIGAND, HERMANN J. 1971. *Thomas Mann's novel Der Zauberberg: a study*. New York: AMS Press
- WEIKART RICHARD. 1993. The Origins of Social Darwinism in Germany, 1859-1895. *Journal of the History of Ideas*. Vol. 54, No. 3. pp. 469-488.
- WEIKLE, DONALD W. 2000. Eugenics, "Baby Doe", and Peter Singer: toward a more "perfect" society: a response. *Mental Retardation*. Vol. 38, No. 5, October 2000
- WEIL JON. 2003. Psychosocial genetic counselling in the post-nondirective era: a point of view. *Journal of Genetic Counseling*. Vol. 12, No. 3, June 2003
- WEINDLING, PAUL J. 1987. Die Verbreitung rassenhygienischen/eugenischen Gedankengutes in bürgerlichen und sozialistischen Kreisen in der Weimar Republik. *Medizinhistorisches Journal* 22: 352-368
- WEINDLING, PAUL J. 1988. Fascism and population in comparative European perspective. *Population and development review*, volume 14, Issue supplement: population and resources in western intellectual traditions (1988), 102-121
- WEINDLING, PAUL J. 1989a. *Health, race and German politics between national unification and Nazism, 1870-1945*. Cambridge: Cambridge University Press.
- WEINDLING, PAUL J. 1989b. The 'Sonderweg' of German eugenics: Nationalism and scientific internationalism. *The British Journal for the History of Science*. 22: 321-333.
- WEINDLING, PAUL J. 1991. *Darwinism and Social Darwinism in Imperial Germany: the contribution of the Cell Biologist Oscar Hertwig (1849-1922)*. Stuttgart, New York: Gustav Fischer.
- WEINDLING, PAUL JULIAN. 2000. *Epidemics and genocide in eastern Europe. 1890-1945*. Oxford [etc.]: Oxford University Press
- WEINGART PETER. 1987. The rationalization of sexual behavior: the institutionalisation of eugenic thought in Germany. *Journal of the history of biology*, vol. 20, No. 2, Summer 1987, pp. 159-193
- WEINGART PETER, KROLL JÜRGEN, BAYERTZ KURT. 1988. *Rasse, Blut und Gene*. Frankfurt am Main: Suhrkamp Verlag.
- WEINGART PETER. 1995. Eugenics – Medical or Social Science? *Science in context*, 8,1 (1995), pp. 197-207
- WEINGART PETER, RICHARDSON, PETER J., MITCHELL, SANDRA D., MAASEN SABINE. 1997. *Human by nature: between biology and the social science*. Mahwah (New Jersey): Lawrence Erlbaum Associates.

- WEINGART PETER. 1999. Scientific expertise and political accountability: paradoxes of science in politics. *Science and Public Policy*. 26/3 June 1999.
- WEINTRAUB PAMELA (ed.). 1984. *The OMNI interviews*. New York: Ticknor & Fields
- WEISSE, B. ALLEN. 1998. *The staff and the serpent. Pertinent and impertinent observations on the world of medicine*. Carbondale and Edwardsville: Southern Illinois University Press
- WELLMAN KATHLEEN. 2001. Physicians and philosophes: physiology and sexual morality in the French Enlightenment. *Eighteenth-century studies*, vol. 35, n. 2
- WENIG KLAUS. 1995. *Rudolph Virchow und Emil du Bois-Reymond: Briefe 1864-1894*. Marburg: Basilisk
- WERTZ, DOROTHY C. 1998. Eugenics is alive and well: a survey of genetic professionals around the world. *Science in context*, 11, 3-4, 99. 493-510
- WEB LUDGER (ed.). 1989. *Die Träume der Genetik. Gentechnische Utopien von sozialem Fortschritt*. GRENÖ: Nördlingen
- WHITE, JOHN J. 1996. *Leben des Galilei*. London: Grant & Cutler.
- WHITE, STEPHEN K. 1980. Reason and Authority in Habermas: A Critique of the Critics. *The American Political Science Review*. Vol. 74, No. 4. pp. 1007-1017
- WHITE, STEPHEN K (ed.). 1995. *The Cambridge companion to Habermas*. Cambridge: Cambridge University Press.
- WIDMANN GIOVANNI. 2000-2001 (academic year). *L'eugenetica in Italia. Lineamenti storici, problemi etici e sociali*. Università di Padova, facoltà di scienze della formazione, corso di laurea in scienze dell'educazione.
- WIKLER DANIEL. 1998. Eugenic values. *Science in Context* 11, 3-4, 1998, pp. 455-470
- WIKLER DANIEL. 1999. Can we learn from eugenics? *The New Genetics. Journal of Medical Ethics* [Special Issue] 25(2): 75-214.
- WILLIAMS CLARE, ALDERSON PRISCILLA, FARSIDES BOBBIE. 2002. Is nondirectiveness possible within the context of antenatal screening and testing? *Social Science & Medicine*. Vol. 54, Issue 3, pp. 339-347
- WILLIAMS PETER, WALLACE DAVID. 1989. *Unit 731. The Japanese Army's secret of secrets*. London [etc.]: Hodder & Stoughton
- WILSON, DANIEL J. 1980. Arthur O. Lovejoy and the moral of the Great Chain of Being. *Journal of the History of Ideas*. .249-265
- WINGERTSON LOIS. 1998. *Unnatural selection. The promise and the power of human gene research*. New York [etc.]: Bantam Books
- WINKLER, ALLAN M. 1993. The „Atom“ and American life. *The history teacher*, vol. 26, No. 3 (May, 1993), 317-337
- WINTER ALISON. 1998. *Mesmerized. Powers of Mind in Victorian Britain*. Chicago and London: The University of Chicago Press
- WINTER, CHARLES A. 1970. *Opportunities in the biological sciences*. New York: UPDC
- WOFSEY LEON. 1986. Biotechnology and the University. *Journal of Higher Education*. Vol. 57, No. 5. pp. 477-492.
- WOLSTENHOLME GORDON. 1963. *Man and his future*. London: J & A Churchill.
- WOODHOUSE EDWARD, HESS DAVID, BREYMAN STEVE, MARTIN BRIAN. 2002. Science Studies and Activism. *Social Studies of Science*. Volume 32, No. 2.
- WORBOYS MICHAEL. 2000. *Spreading Germs. Disease theories and medical practice in Britain, 1865-1900*. Cambridge [etc.]: Cambridge University Press
- MILLS, C. WRIGHT. 1956 [1970] *The Power Elite*. New York: Oxford University Press.
- WUKETITS, FRANZ M. 1998. *Eine kurze Kulturgeschichte der Biologie*. Darmstadt: Primus
- YOUNG LOLA. 1996. *Fear of the dark. Race, gender and sexuality in the Cinema*. Routledge: London and New York.
- ZACK NAOMI. 2002. *Philosophy of science and race*. New York and London: Routledge
- ZILSEL EDGAR. 1942. The Sociological Roots of Science. *American Journal of Sociology*, 47: 544-562
- ZIMMERMAN, ANDREW D. 1995. Toward a more democratic ethic of technological governance. *Science, Technology, & Human Values*, Vol. 20, No. 1 (winter, 1995), 86-107
- ZIMMERMANN, EDUARDO A. 1992. Racial Ideas and social reform: Argentina 1890-1916. *The Hispanic American historical review*, volume 72, Issue 1 (Feb, 1992), 23-46
- ZWEIGER GARY. 2001. *Transducing the Genome. Information, anarchy, and revolution in the biomedical sciences*. New York [etc.]: McGraw-Hill